TeraPac

User Operation and Maintenance Guide

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Part Number: 209-0029-0

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Regulatory Approvals

EN60950, EN55024, EN55022, FCC, Part 15, EN61000-3-2 & EN61000-3-3.

Warnings

Changes or modifications to this device that are not approved by the party responsible for compliance could void the user's authority to operate the equipment.

To reduce the risk of electrical shock, do not attempt to open the device unless instructed to do so. Do not use any tool for purposes other than instructed.

A Lithium Ion battery is included with the system motherboard. This battery is used for the Real Time Clock (RTC) circuit. The expected lifetime of the battery is approximately 5 years. There is a danger of explosion if this battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the motherboard manufacturer. Dispose of used batteries according to the manufacturer's instructions.

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Chapter 1: Introduction and Very Important (Must-Read) Information!

Very Important Information!

RAID Arrays in general – and RAID controllers in particular – can be somewhat tricky to work with. It is very easy to lose your data – and your operating system – if you execute an incorrect sequence of commands. Thus, unless you are very experienced in the use of the MegaRAID SCSI controller card and its BIOS-level setup utility, it is strongly recommended that you follow the step-by-step instructions provided in this manual.

In particular, note that once you have a MaxPac and TeraPac that have been mated (power-up and initialized) together – which is the way a new MaxPac/TeraPac combo arrive when you purchase them together – you should never subsequently power-up the MaxPac without having the TeraPac connected to it. (In the unfortunate event that you do power-up the MaxPac without having the TeraPac connected to it, see Chapter 5 in this manual for details on how to recover from this situation.)

Documentation Conventions

Icons

- The information icon is used to annotate important information.

- The exclamation icon is used to annotate cautionary information.

Fonts

- *Italics* font is used for emphasis, book titles, commands, and path and file names.
- **Bold** may be used to emphasize text, highlight menu items, and denote the titles of dialog boxes.
- **Menu > Command** identifies the path used to select a menu command.
- `Courier` font is used for program listings and for any text messages that the software displays on the screen.
- **Note:** describes important information, warnings, or unique commands.
- “Select” means click the left mouse button on the indicated item.
- “Click-left” (or just “click”) means click the left mouse button on the indicated item.
- “Click-middle” means click the middle mouse button on the indicated item.
- “Click-right” means click the right mouse button on the indicated item.
- “Double-click” means click twice consecutively with the left mouse button.
- “Drag-left” (or just “drag”) means press and hold the left mouse button on the indicated item, then move the cursor (pointer) to the destination and release the button.
- “Shift-click-left” means press and hold the <Shift> key then click the left mouse button on the indicated item.
- “Ctrl-click-left” means press and hold the <Ctrl> key then click the left mouse button on the indicated item.

Chapter 2: Unpacking your TeraPac and Connecting it to a MaxPac

Unpacking and Setting-up Your MaxPac

Unpack your MaxPac X-Class system and connect its cables (power, mouse, keyboard, and network) as described in the *MaxPac X-Class User Operation and Maintenance Guide*.

Note: Do NOT power-up your MaxPac until you have connected it to the TeraPac as discussed later in this Chapter. Also, in the case of dual- or triple-display systems, do not unfold the display screens at this time (wait until after you have connected the TeraPac to the MaxPac).

Inspect the TeraPac Shipment

TeraPac systems are packaged to withstand the roughest of treatment during shipping. Any boxes, foam core padding, and anti-static bags should be stored safely away in case you need to ship the system for any reason in the future. Inspect the box the system arrived in. If there is any unusual damage to the box, make note of the damage on the delivery form and contact MaxVision support (see *Appendix A for more details*).

Unpacking the TeraPac

TeraPac units are always shipped inside an associated Pelican case, which weighs 22 lbs. Depending on the configuration of your TeraPac – which can contain from three to eight disk drives, each weighing 2 lbs – the TeraPac/Pelican combo will weigh between 48 lbs and 58 lbs (including the packaging). If you are unable to lift this weight safely, you should obtain assistance in unpacking and moving the system.

1) Place the cardboard packing box containing the Pelican case and the TeraPac unit on the floor.
2) Clear an area on a desk or table on which to place the TeraPac system.
3) Carefully cut the tape on top of the outer cardboard packing box and open the box (Figure 2-1).

Figure 2-1. Open the outer packing box

4) Have two people (one on each side) lift the Pelican case. Keeping your back straight, bending at the knees and using your legs as much as possible, take the Pelican case out of the box.

Note: In order to raise or lower the handle on the Pelican case, use your thumb to slide the release catch to the right (if looking toward the back of the case as shown in Figure 2-2).

Figure 2-2. Use the release catch to operate the handle on the Pelican case

5) Place the Pelican case flat on its back on the floor and open it (Figure 2-3).

6) Lift the TeraPac out of the Pelican case (with the aid of a colleague if necessary) and place it on the desk next to the main MaxPac system (Figure 2-4).

Figure 2-3

Figure 2-4

Location and Power Requirements

Location

Your TeraPac unit needs to be positioned in a location with the capacity to safely support the main MaxPac X-Class system plus least 26 lbs to 36 lbs depending on the TeraPac configuration. The unit should be unobstructed so as to permit the free flow of cooling air through the intake and exhaust vents.

Power Requirements

TeraPac X-Class power supplies are auto-sensing 100 to 240 VAC, 50 to 60Hz units. Ensure that the supplied power is sufficient, stable, and without spikes or surges for operation of your TeraPac and other required equipment.

Setting-Up Your TeraPac

Note: The following discussions assume that your main MaxPac X-Class system is already equipped with a MegaRAID card. However, if you purchased your TeraPac as a separate unit, you may need to add a MegaRAID card to the MaxPac before proceeding with the rest of these instructions (see Chapter 4 for more details).

1) Observe the two black knurled thumbscrews on either side of the case (Figure 2-4). Unscrew these screws (Figure 2-5), pull the cover away from the main unit, and lay it on the desk (Figure 2-6).

Figure 2-5

Figure 2-6

2) Insert your thumb and index finger into the two holes located toward the center of the inside cover (Figure 2-7) and lift this cover away to reveal the TeraPac's data/control cable and power cable (Figure 2-8).

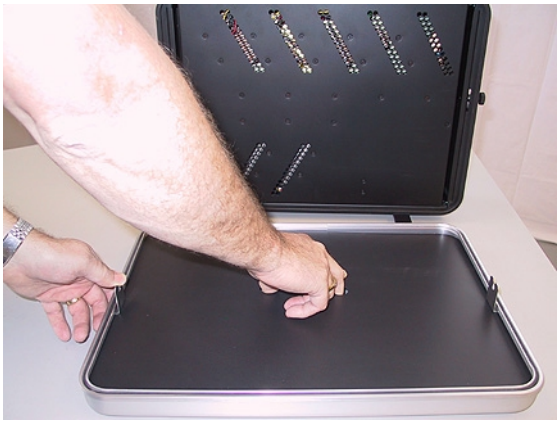

Figure 2-7

Figure 2-8

3) Now pull the right-hand thumbscrew out from the main case and slide the protective panel out of the way to reveal the data/control and power connectors (Figure 2-9).

4) Turn the TeraPac around such that its connectors face the MaxPac system (Figure 2-10).

Figure 2-9

Figure 2-10

5) Plug one end of the TeraPac's data/control cable into the main MaxPac system (Figure 2-11).

Note: Make sure that you tighten the jack screws so as to hold the connector firmly in place.

6) Plug the other end of the data/control cable into the TeraPac (Figure 2-12).

Note: Make sure that you tighten the jack screws so as to hold the connector firmly in place.

Figure 2-11

Figure 2-12

7) Connect the TeraPac's main power cable (Figure 2-13) and plug the other end into an appropriate power supply.

Figure 2-13

Note: The TeraPac doesn't have an On/Off power switch, because its power-up state is automatically controlled by the MegaRAID controller via the TeraPac's data/control cable.

Chapter 3: Powering-up a New MaxPac/TeraPac Combo

Before You Start

The instructions in this chapter assume that you have just taken delivery of a new MaxPac/TeraPac combo and that you are about to power them up for the very first time.

1) Unpack your MaxPac X-Class system and connect its cables (power, mouse, keyboard, and network) as described in the *MaxPac X-Class User Operation and Maintenance Guide*.

Note: Do NOT power-up your MaxPac until you have connected it to the TeraPac as discussed later in this Chapter. Also, in the case of dual- or triple-display systems, do not unfold the display screens at this time (wait until after you have connected the TeraPac to the MaxPac).

2) Unpack your TeraPac unit and connect it to the MaxPac as described in Chapter 2 of this manual.

3) In the case of dual- or triple-display MaxPac systems, unfold the display screens at this time.

Powering-up Your MaxPac/TeraPac Combo

The following instructions assume that the system has been configured such that one channel of the MegaRAID card is controlling an internal SCSI disk (the main system disk) on one of its channels and the external TeraPac RAID array on its other channel.

1) Power-up the MaxPac as discussed in the *MaxPac X-Class User Operation and Maintenance Guide*. Observe that the BIOS boot sequence should reflect the fact that two logical drives have been found on the host adapter as shown in Figure 3-1 (the main point here is that you shouldn't see any error messages).

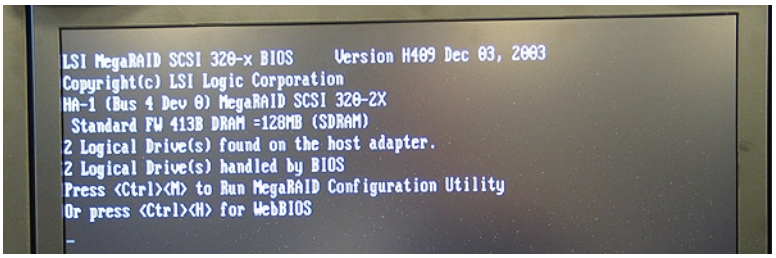
LSI MegaRAID SCSI 320-x BIOS Version H409 Dec 03, 2003
Copyright(c) LSI Logic Corporation
HA-1 (Bus 4 Dev 0) MegaRAID SCSI 320-2X
Standard FW 413B DRAM =128MB (SDRAM)
2 Logical Drive(s) found on the host adapter.
2 Logical Drive(s) handled by BIOS
Press <Ctrl><M> to Run MegaRAID Configuration Utility
Or press <Ctrl><H> for WebBIOS

Figure 3-1

Note: The TeraPac doesn't have an On/Off power switch, because its power-up state is automatically controlled by the MegaRAID controller via the TeraPac's data/control cable.

2) Power the system all the way up into Windows®, enter your Windows license information, and register your operating system as discussed in the *MaxPac X-Class User Operation and Maintenance Guide*.

3) Right-click on the **My Computer** icon on your desktop, and then select (left-click) the **Manage** item from the ensuing pop-up menu.

4) Click the '+' symbol next to the **Storage** item (if this item is in its collapsed state) in the left-hand navigation pane, and then select the **Disk Management** item. You should see two disk drives similar to those shown in Figure 3-2.

Note: In this example, **Disk 0** (drive **C:**) is the main system disk, while **Disk 1** (drive **E:**) is the TeraPac RAID array.

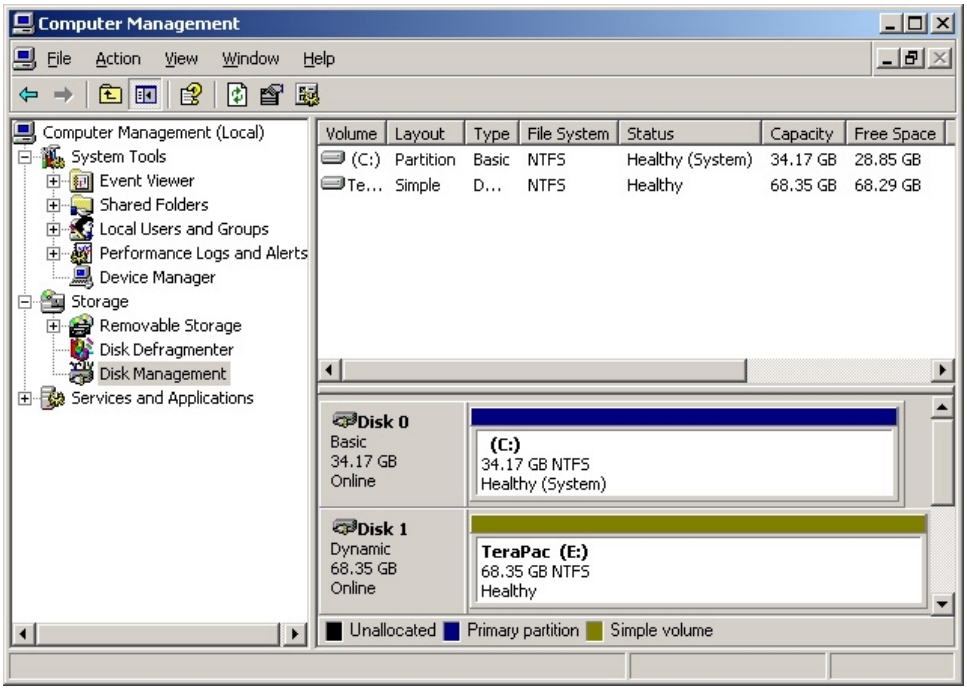

Figure 3-2

5) It is recommended that you copy a few large files and folders from the main system drive to the TeraPac array to ensure that everything is working as expected (don't forget to delete these files from the TeraPac when you have completed your tests).

Note: Whenever you wish to use your MaxPac in the future, ensure that your TeraPac has power and is connected to the MaxPac before powering-up the MaxPac.

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Chapter 4: Adding a New TeraPac to an Existing MaxPac

Before You Start

The instructions in this chapter assume that you have just taken delivery of a new TeraPac RAID array that you wish to use with an existing MaxPac X-Class system. In this case, there are many different configuration possibilities; for example:

a) Your MaxPac may have an IDE hard drive as its main system disk.

   In this case, your TeraPac will be shipped to you with an associated MegaRAID SCSI control card. You should first insert this PCI card into your MaxPac as discussed in the *MaxPac X-Class User Operation and Maintenance Guide*.

b) Your MaxPac may have a SCSI hard drive as its main system disk, where this disk has its own dedicated SCSI card.

   In this case, your TeraPac will be shipped to you with an associated MegaRAID SCSI control card. You should first insert this PCI card into your MaxPac as discussed in the *MaxPac X-Class User Operation and Maintenance Guide*.

Note: Theoretically, you could remove the existing SCSI card from the MaxPac system and use one of the channels from the MegaRAID card to control the internal system disk. However, this is NOT recommended (this option should only be exercised in the case of an overwhelming need to do s0, such as a lack of available PCI slots).

c) Your MaxPac may have a SCSI hard drive as its main system disk, and this disk may be driven by one channel of a MegaRAID SCSI control card, in which case the other channel is free to be used to control the external TeraPac RAID array.

The discussions and images in the rest of this chapter assume that your system is configured as described in option c). This means that the operating system disk is visible on one of the channels, which would not be the case with regards to options a) and b).

1) Unpack your MaxPac X-Class system. If this system does not already contain a MegaRAID card, then insert this card – which will be shipped with your TeraPac – into your MaxPac as discussed in the *MaxPac X-Class User Operation and Maintenance Guide*. Then connect the MaxPac's cables (power, mouse, keyboard, and network) as described in the *MaxPac X-Class User Operation and Maintenance Guide*.

Note: Do NOT power-up your MaxPac until you have connected it to the TeraPac as discussed later in this Chapter. Also, in the case of dual- or triple-display systems, do not unfold the display screens at this time (wait until after you have connected the TeraPac to the MaxPac).

2) Unpack your TeraPac unit and connect it to the MaxPac as described in Chapter 2 of this manual.

3) In the case of dual- or triple-display MaxPac systems, unfold the display screens at this time.

Powering-up Your MaxPac/TeraPac Combo

1) Power-up the MaxPac (we are going to perform a quick "sanity check" to prove that the MaxPac does not yet see the TeraPac's RAID array).

Note: The TeraPac doesn't have an On/Off power switch, because its power-up state is automatically controlled by the MegaRAID controller via the TeraPac's data/control cable.

2) Right-click on the **My Computer** icon on your desktop, and then select (left-click) the **Manage** item from the ensuing pop-up menu.

3) Click the '+' symbol next to the **Storage** item (if this item is in its collapsed state) in the left-hand navigation pane, and then select the **Disk Management** item. Observe that, in the case of this particular configuration, the system currently only recognizes the main operating system disk (the C: drive) and the CD-DVD (the D: drive) as shown in Figure 4-1.

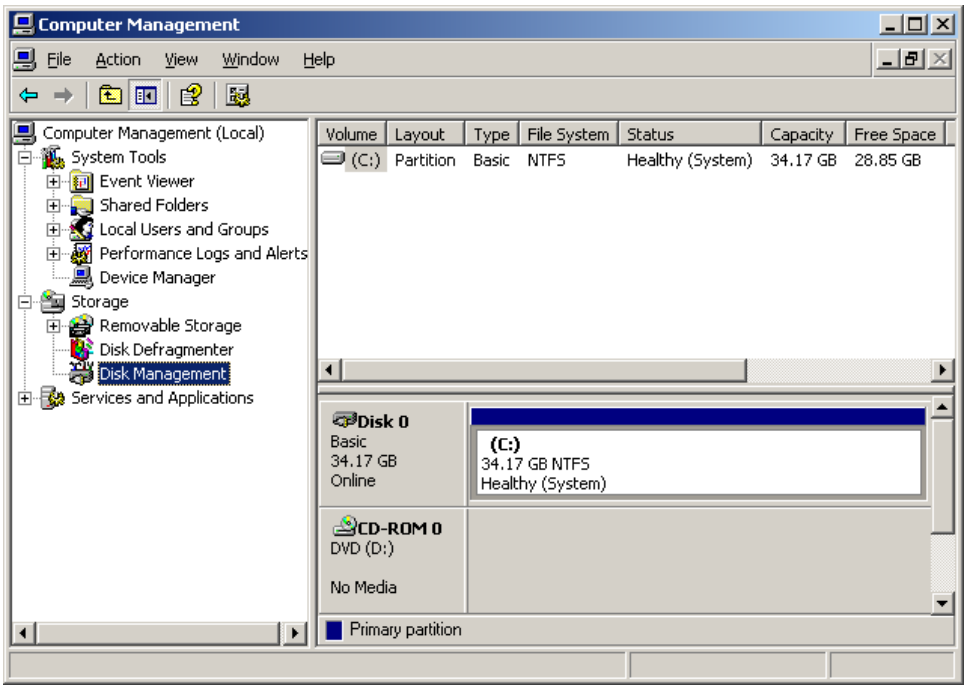

Figure 4-1

4) Power-down the MaxPac and then start the power-up sequence again (be prepared to press the **<Ctrl>M** keys – that is, press the <Ctrl> key and the 'M' key at the same time – as discussed in the following notes.

5) Observe the BIOS reporting that it is spinning up the SCSI drives, followed by messages reporting that the MegaRAID controller has detected only one logical drive (this is our system disk) as shown in Figure 4-2.

Note: The reason the MegaRAID card detects a logical drive at this stage is that we are assuming that this card was already being used to control the system drive. If the MegaRAID card has just been installed into a system with and ISA disk for a system drive (or with a SCSI disk being controlled by its own dedicated SCSI card), then it won't detect any logical drives at this stage.

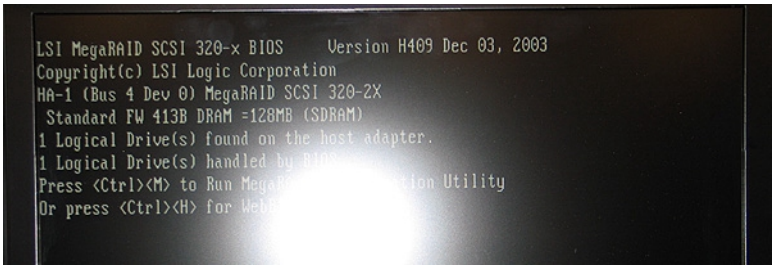
LSI MegaRAID SCSI 320-x BIOS Version H409 Dec 03, 2003
Copyright(c) LSI Logic Corporation
HA-1 (Bus 4 Dev 0) MegaRAID SCSI 320-2X
Standard FW 413B DRAM =128MB (SDRAM)
1 Logical Drive(s) found on the host adapter.
1 Logical Drive(s) handled by BIOS
Press <Ctrl><M> to Run MegaRAID Configuration Utility
Or press <Ctrl><H> for WebBIOS

Figure 4-2

6) Pres the **<Ctrl>M** keys as soon as you see the message inviting you to do so, which will result in you being placed in the MegaRAID configuration utility.

7) Use the **Up/Down** arrow keys to highlight the “Configure” item in the main menu (Figure 4-3).

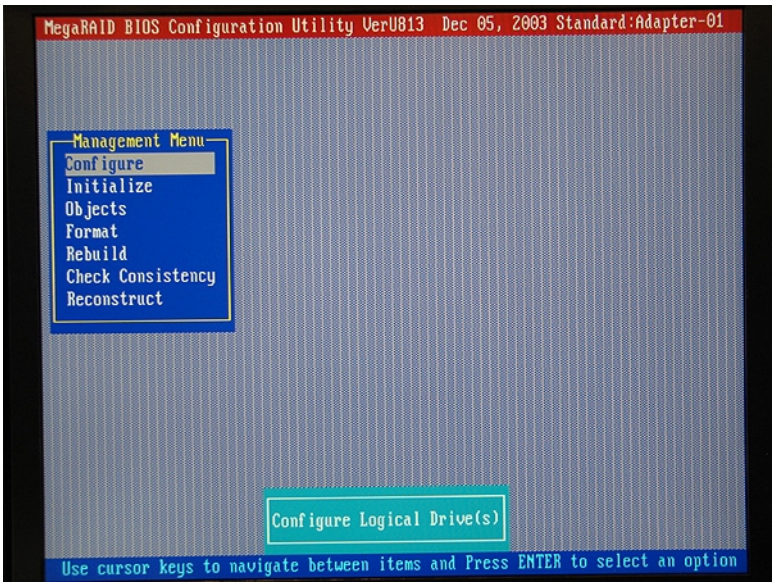

Figure 4-3

8) Press the **<Enter>** key to select this option.

9) Use the **Up/Down** arrow keys to highlight the “View/Add Configuration” item in the ensuing menu (Figure 4-4).

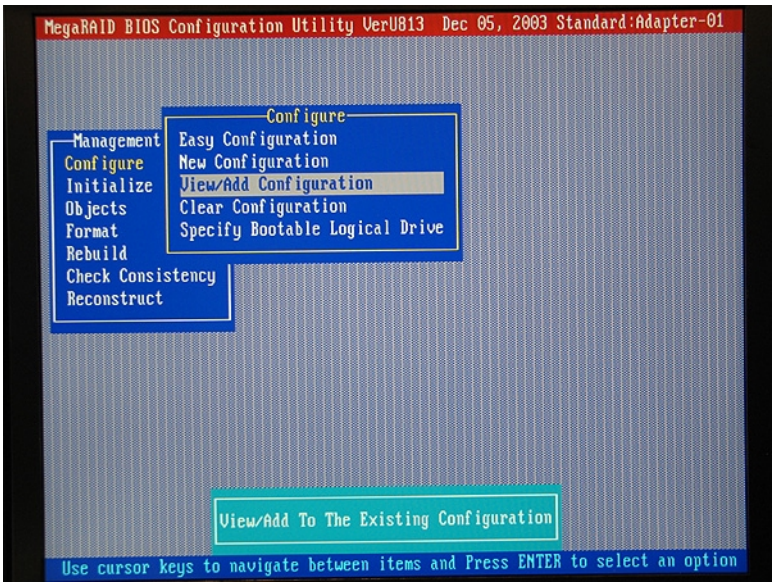

Figure 4-4

10) Press the **<Enter>** key to select this option.

11) Observe that the status bar at the bottom of the screen indicates that the system is being scanned for drives. When the scan has been performed, the results are displayed as shown in Figure 4-5.

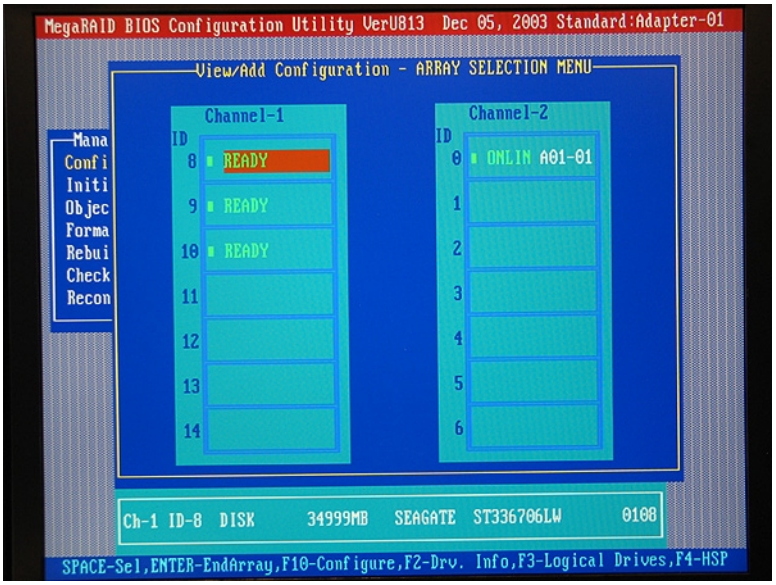

Figure 4-5

12) In this particular example configuration, the MegaRAID controller has detected the operating system disc on Channel 2 on the right-hand side of the screen (the status of this disk is shown as being **Online**). The controller has also found the three disks in our TeraPac on Channel 1 on the left-hand side of the screen (the status of these disks is shown as being **Ready**).

Note: Any disks in the main MaxPac system are assigned numbers from 0 through 7. By comparison, the disks in the TeraPac are always numbered starting at 8. The minimum number of disks in a TeraPac are three (because this is the smallest number that can support RAID 5), in which case these would be numbered 8, 9, and 10. The maximum number of drives is eight, which will be numbered from 8 to 15.

However, the display above shows only drives 0 through 6 on the right-hand side and drives 8 through 14 on the left-hand side. In the case of TeraPac units that do have a full complement of eight disks, the “hidden” drive (number 15) can be seen by using the **Up/Down** arrow keys to scroll through the drives to the bottom of the list, at which point the list will scroll up to reveal the hidden drive.

13) Use the **Up/Down** arrow keys to highlight the first drive (drive 8 shown Red in Figure 4-5 above), then press the **<Space>** key to select this drive. Observe that the status of this drive is changed to Online, it starts flashing.

14) Use the **Up/Down** arrow keys to highlight the next drive (drive 9 shown Red in Figure 4-6 below).

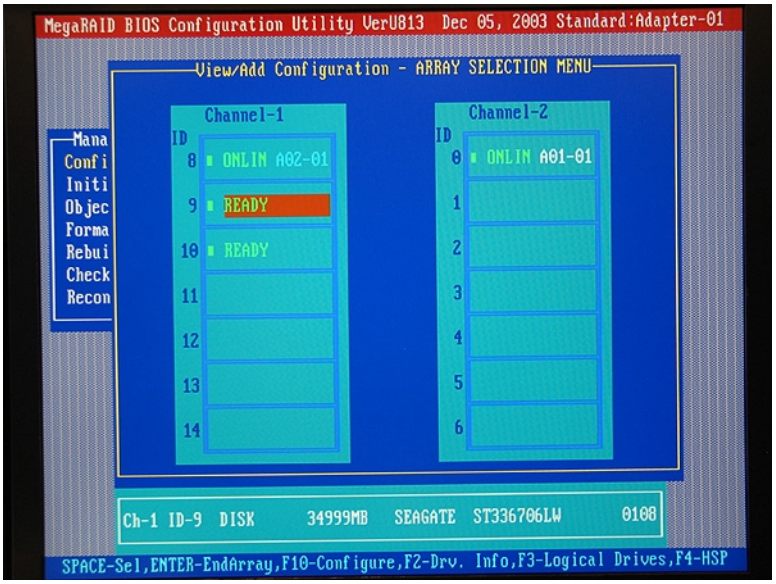

Figure 4-6

15) Press the **<Space>** key to select this drive. Repeat this process to select the remaining drive as shown in Figure 4-7 (you will, of course, have to repeat this process more times if you have more disks in your TeraPac).

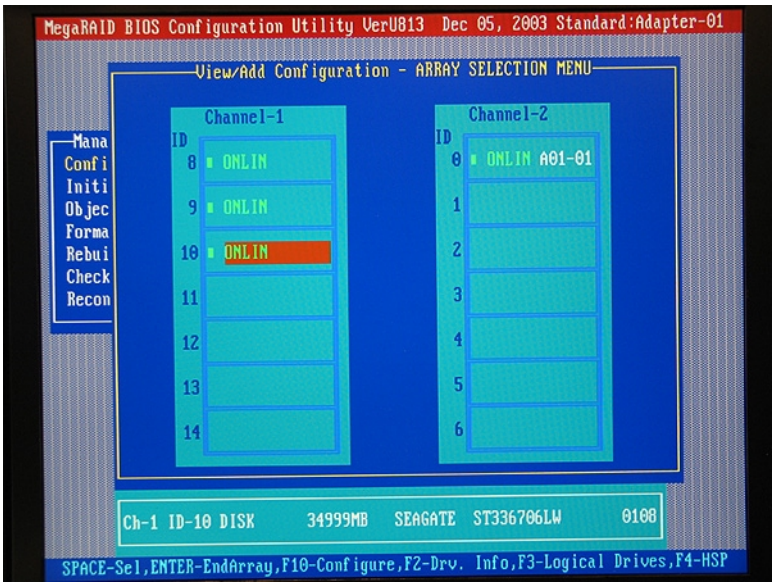

Figure 4-7

16) Once all of the drives are shown as being Online (and blinking), press the **<Enter>** key to end/establish the array (the disks will stop blinking) and then press the **<F10>** key to access the **Select Configurable Arrays** dialog as shown in Figure 4-8).

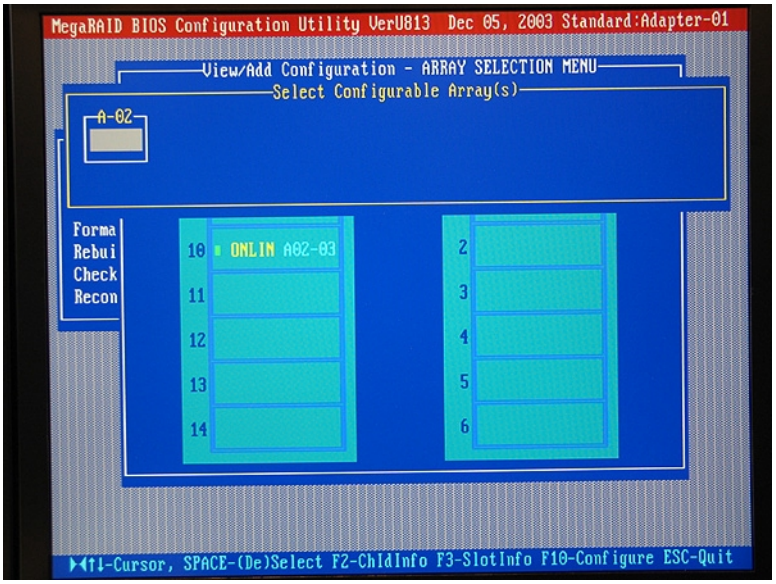

Figure 4-8

Note: Any disks in the main MaxPac system are assigned numbers from 0 through 7. By comparison, the disks in the TeraPac are always numbered starting at 8. The minimum number of disks in a TeraPac are three (because this is the smallest number that can support RAID 5), in which case these would be numbered 8, 9, and 10. The maximum number of drives is eight, which will be numbered from 8 to 15.

17) Press the **<Space>** key to select the required array, which will turn from Gray (as shown in Figure 4-8) to Green (as shown in Figure 4-9).

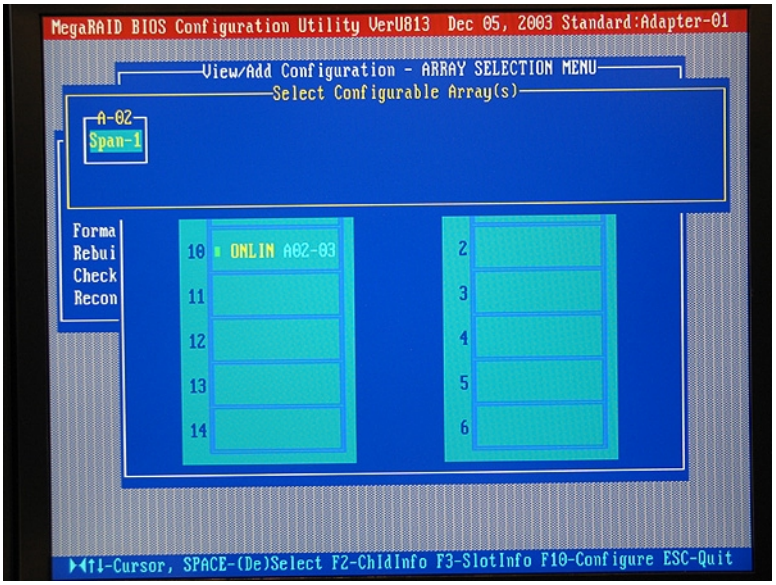

Figure 4-9

18) Press the **<F10>** key to configure the selected array, which will result in the **Logical Drives Configured** dialog (Figure 4-10).

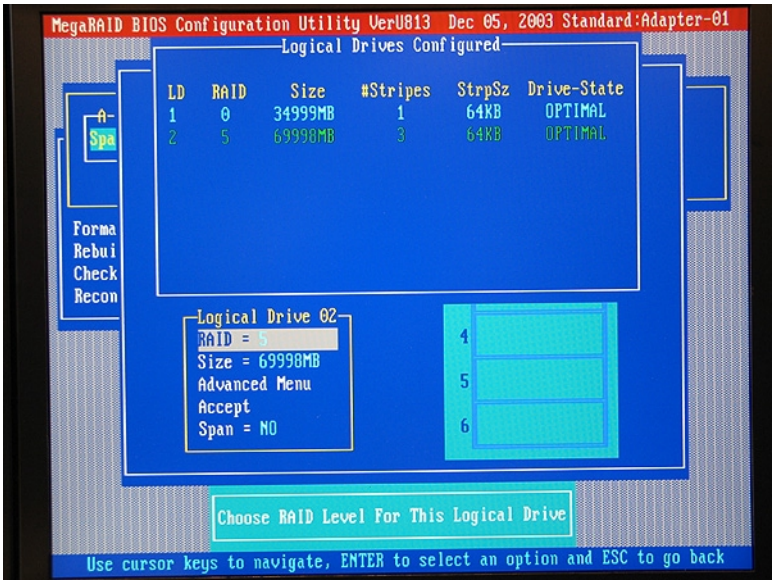
MegaRAID BIOS Configuration Utility VerU813 Dec 05, 2003 Standard:Adapter-01
Logical Drives Configured
LD RAID Size #Stripes StrpSz Drive-State
1 0 34999MB 1 64KB OPTIMAL
2 5 69998MB 3 64KB OPTIMAL
Logical Drive 02
RAID = 5
Size = 69998MB
Advanced Menu
Accept
Span = NO
Choose RAID Level For This Logical Drive
Use cursor keys to navigate, ENTER to select an option and ESC to go back

Figure 4-10

19) From the area in the lower left-hand side of the screen we can see that **Logical Drive 02** is currently selected. Also, that the default RAID level that will be applied is RAID 5.

    If you are happy with this RAID level, proceed to step (21). Alternatively, if you wish to change this RAID level, use the **Up/Down** arrow keys to highlight the RAID item (as shown in Figure 4-10). Next, press the <Enter> key to access the **RAID Level** sub-dialog, and use the **Up/Down** arrow keys to highlight the required RAID level (we've decided to keep RAID 5 as shown in Figure 4-11).

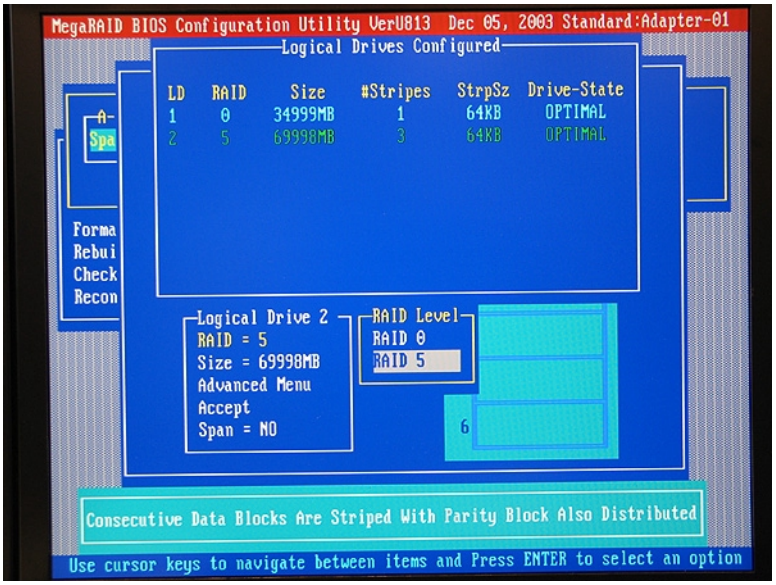
MegaRAID BIOS Configuration Utility VerU813 Dec 05, 2003 Standard:Adapter-01
Logical Drives Configured
LD RAID Size #Stripes StrpSz Drive-State
1 0 34999MB 1 64KB OPTIMAL
2 5 69998MB 3 64KB OPTIMAL
Logical Drive 2
RAID = 5
Size = 69998MB
Advanced Menu
Accept
Span = NO
RAID Level
RAID 0
RAID 5
Consecutive Data Blocks Are Striped With Parity Block Also Distributed
Use cursor keys to navigate between items and Press ENTER to select an option

Figure 4-11

20) Click the <Enter> key to accept the selected RAID level.

21) Use the **Up/Down** arrow keys to highlight the **Accept** item (Figure 4-12).

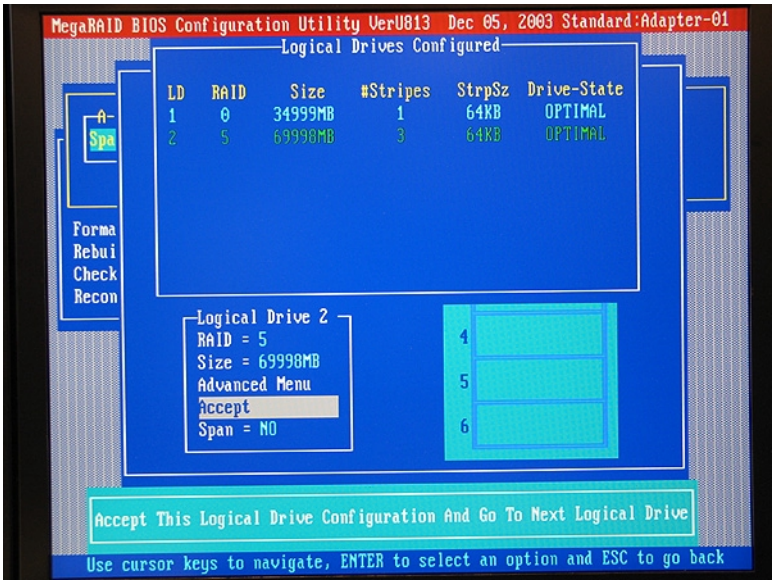
MegaRAID BIOS Configuration Utility VerU813 Dec 05, 2003 Standard:Adapter-01
Logical Drives Configured
LD RAID Size #Stripes StrpSz Drive-State
1 0 34999MB 1 64KB OPTIMAL
2 5 69998MB 3 64KB OPTIMAL
Logical Drive 2
RAID = 5
Size = 69998MB
Advanced Menu
Accept
Span = NO
4
5
6
Accept This Logical Drive Configuration And Go To Next Logical Drive
Use cursor keys to navigate, ENTER to select an option and ESC to go back

Figure 4-12

22) Press the **<Enter>** key to select this item. Observe the **Save Configuration** sub-dialog that appears. Use the **Up/Down** arrow keys to highlight the required **Yes** item (Figure 4-13).

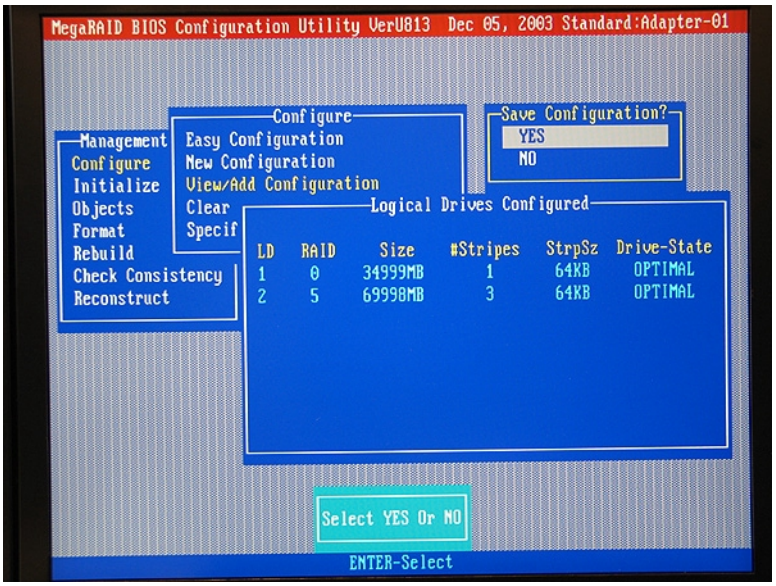

Figure 4-13

23) Press the <Enter> key to confirm this selection, which will result in the **Configuration is Saved – Press Any Key To Continue** dialog appearing on the screen (Figure 4-14).

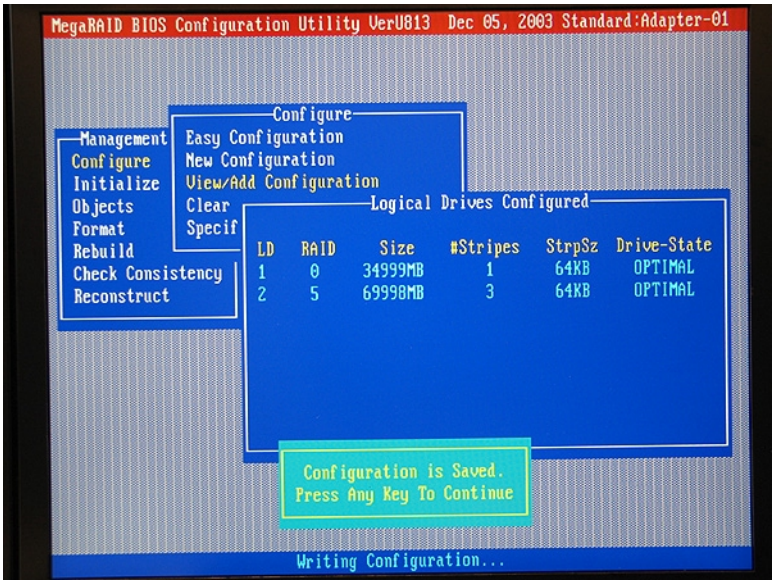

Figure 4-14

24) As the dialog suggests, you may press any key to continue, which will return you to the **View/Add Configuration** dialog (Figure 4-15).

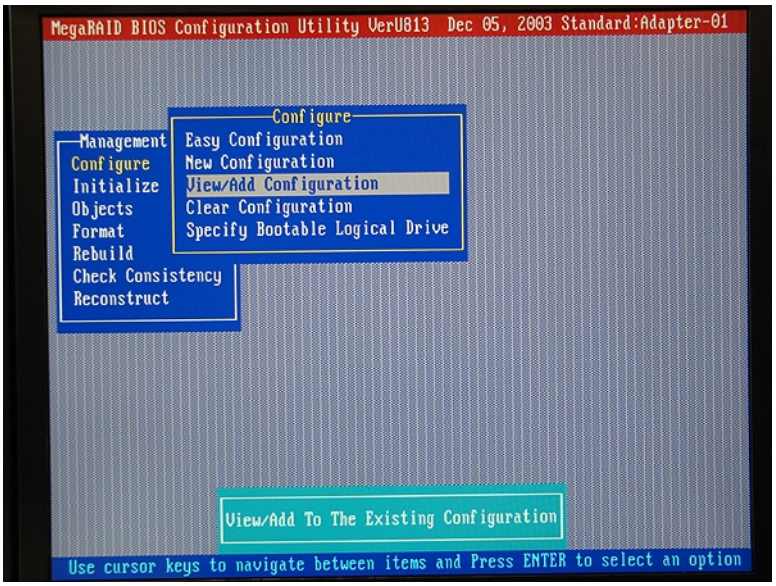

Figure 4-15

25) As we now wish to verify our configuration, press the <Enter> key to select this option. Observe the system scanning the disks as reported in the status bar at the bottom of the window. The system will eventually report that all of the disks are now officially online (Figure 4-16).

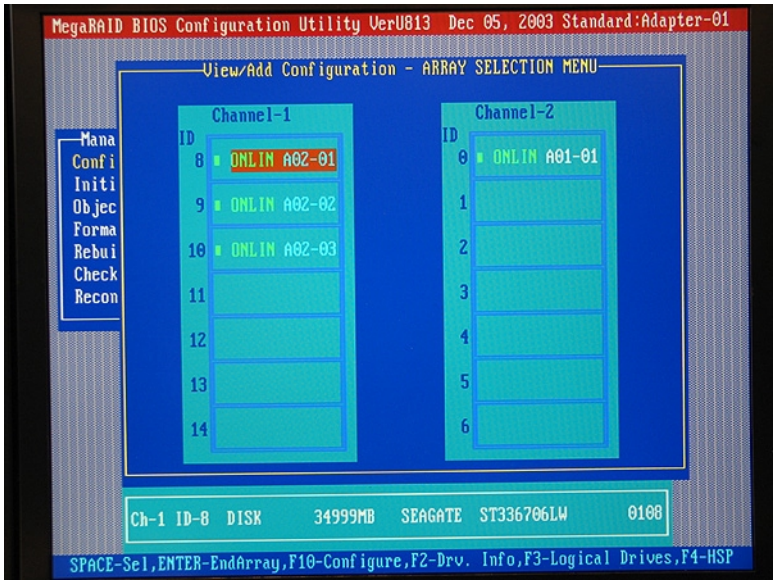

Figure 4-16

26) Press the <F3? Key to see the logical drives, which will result in the **Logical Drives Configured** dialog appearing on the screen (Figure 4-17).

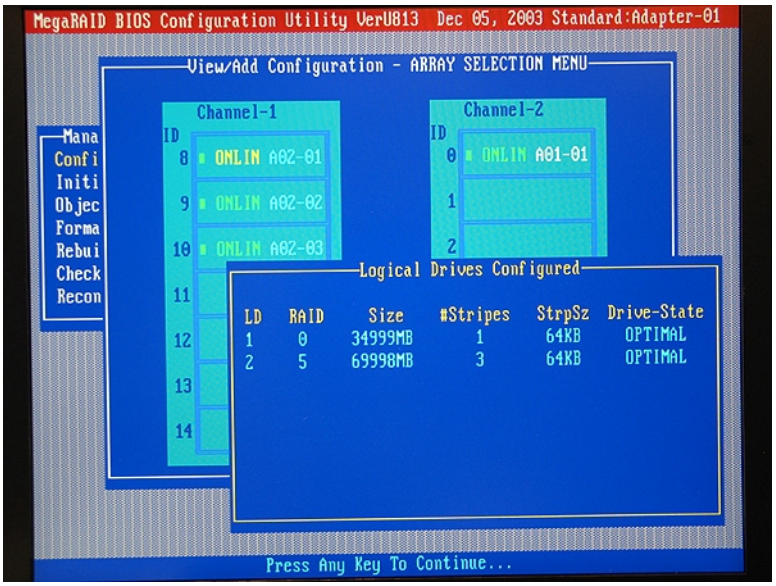

Figure 4-17

27) In the case of our example configuration, logical drive 1 is the system disk with a RAID level of 0, while logical drive 2 is our TeraPac array with a RAID level of 5 (make a note of the corresponding values on your system for future reference).

28) Now we wish to make sure that the system still plans to boot up off the main operating system disk, so pPress the **<Esc>** key one or more times until you reach the **Configure** menu, then use the **Up/Down** arrow keys to highlight the **Specify Bootable Logical Drive** item (Figure 4-18).

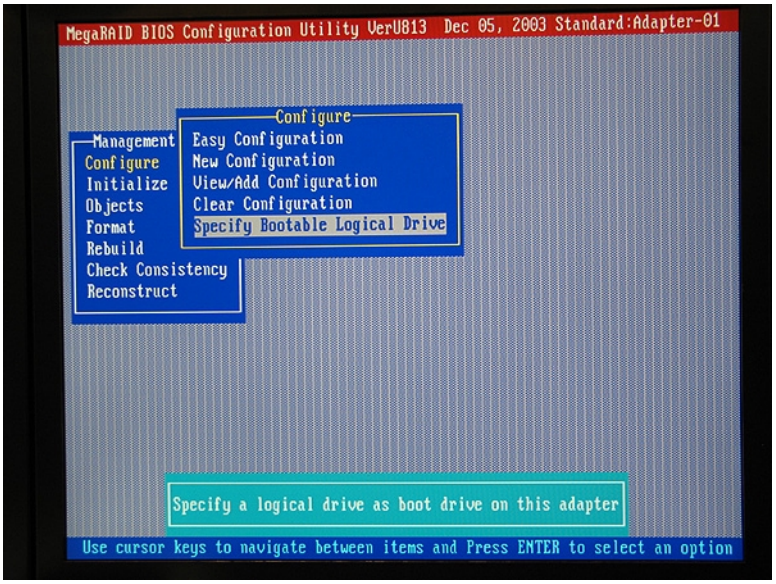

Figure 4-18

29) Press the **<Enter>** key to select this item, which will result in the **Logical BootDrive** sub-dialog appearing at the bottom of the screen (Figure 4-19).

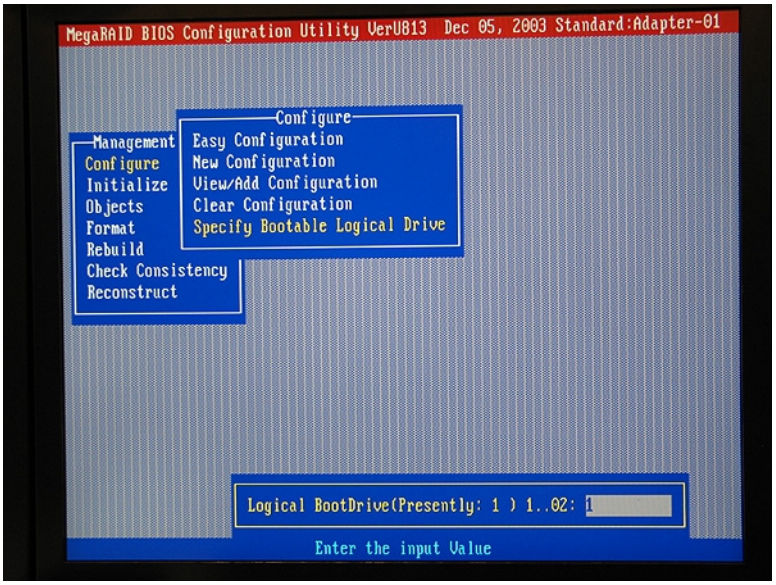

Figure 4-19

30) Use the numeric keypad to specify the number of the logical drive from whence you wish the system to boot (logical drive 1 – which equates to the main system drive – in the case of this example configuration), then press the **<Enter>** key to accept this value.

31) Press the **<Esc>** key repeatedly until you reach the main **Management** menu, then use the **Up/Down** arrow keys to highlight the **Initialization** item (Figure 4-20).

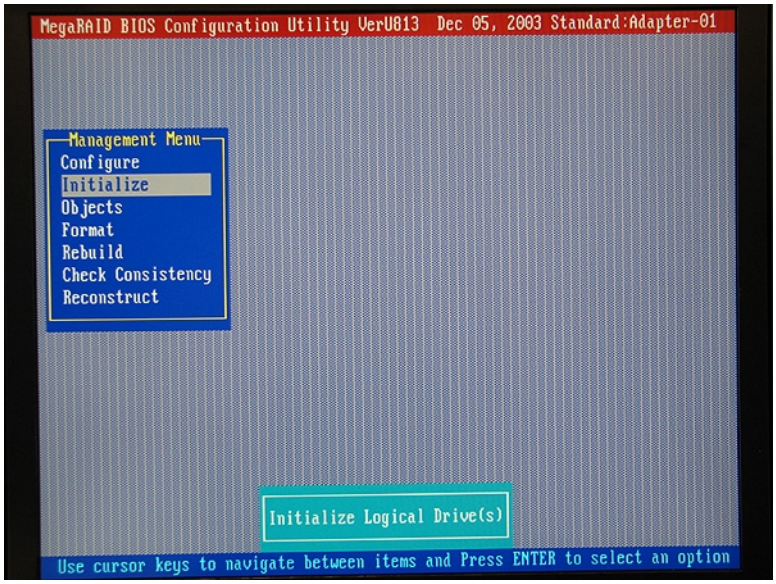

Figure 4-20

32) Press the **<Enter>** key to select this item.

33) In lower left-hand side of the ensuing dialog is the **Logical Drives** sub-dialog. Use the **Up/Down** arrow keys to highlight the TeraPac array (logical drive 2 in this example configuration) as shown in Figure 4-21.

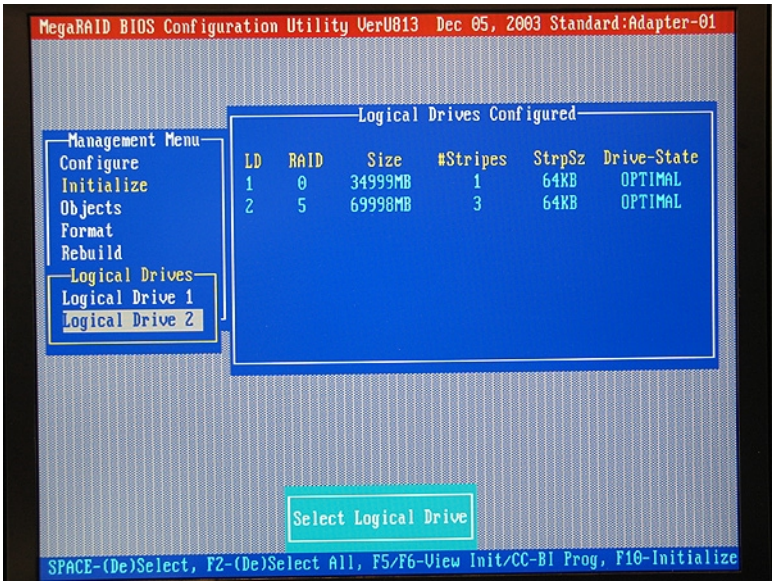

Figure 4-21

34) Press the **<Space>** key to select this drive, which will turn the text Yellow to show that it's been selected (Figure 4-22).

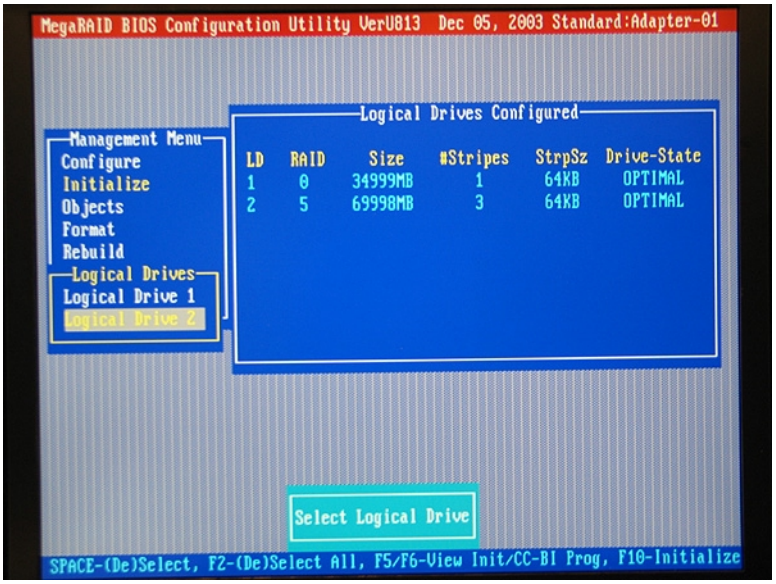

Figure 4-22

35) Now press the **<F10>** key to commence the initialization, which will first cause the **Initialize Yes/No** sub-dialog to appear. Use the **Up/Down** keys to select the **Yes** option as shown in Figure 4-23.

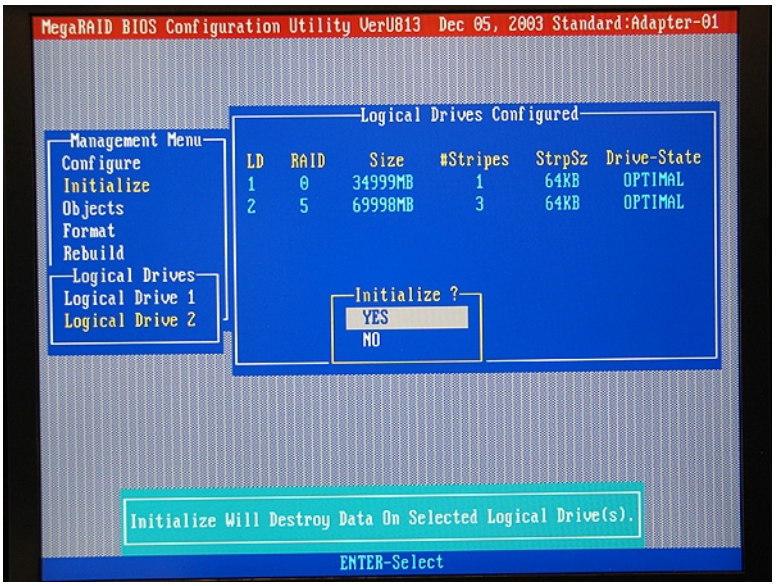

Figure 4-23

36) Press the **<Enter>** key to confirm your selection, which will result in a real-time progress report being displayed on the screen (Figure 4-24).

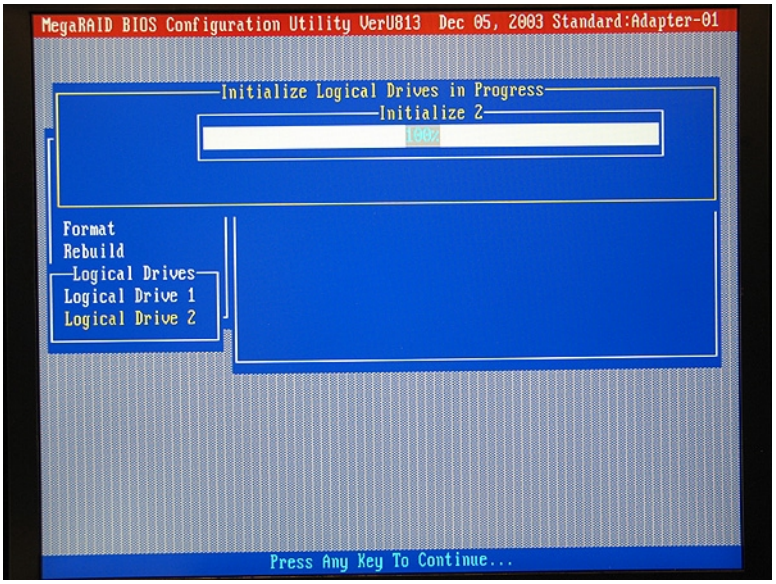

Figure 4-24

37) When the progress reaches 100%, you will be presented with the **Press Any Key To Continue** message in the status bar at the bottom of the screen (Figure 4-24) … so press any key to continue.

38) Press the **<Esc>** key repeatedly until you are presented with the **Exit** dialog, and then use the **Up/Down** arrow keys to select the **Yes** option (Figure 4-25).

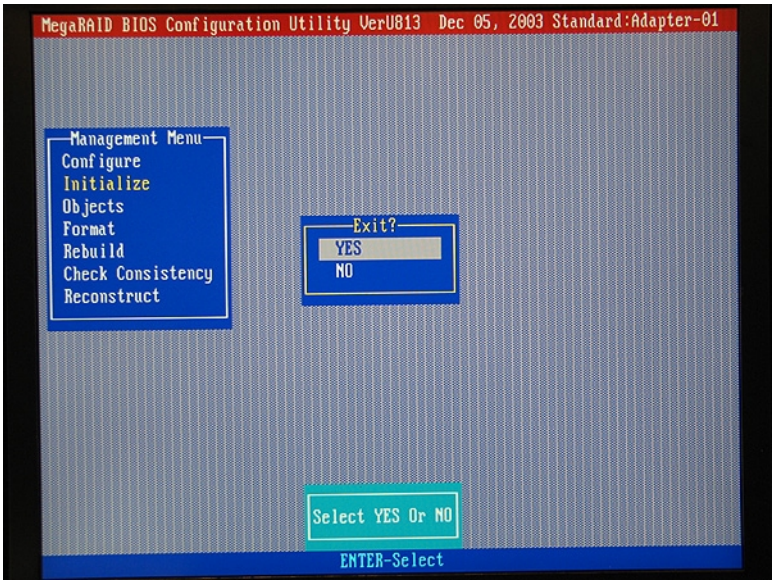

Figure 4-25

39) Press the **<Enter>** key to confirm this selection.

40) When you are presented with a message that the configuration has changed and you need to press the **<Ctrl><Alt><Delete>** keys to reboot …. press the **Ctrl><Alt><Delete>** keys to reboot. This time, when the system does start to reboot, you will see the MegaRAID controller report that it now finds two logical drives as part of the system (Figure 4-26).

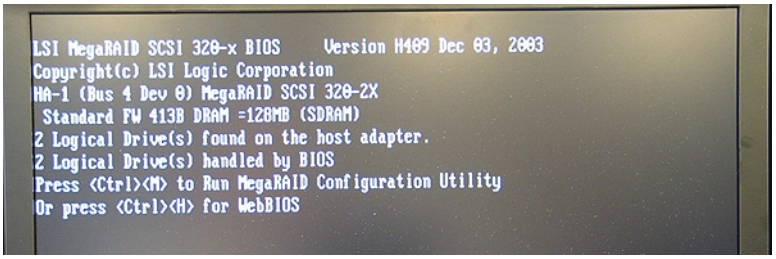
LSI MegaRAID SCSI 320-x BIOS Version H409 Dec 03, 2003
Copyright(c) LSI Logic Corporation
HA-1 (Bus 4 Dev 0) MegaRAID SCSI 320-2X
Standard FW 413B DRAM =128MB (SDRAM)
2 Logical Drive(s) found on the host adapter.
2 Logical Drive(s) handled by BIOS
Press <Ctrl><M> to Run MegaRAID Configuration Utility
Or press <Ctrl><H> for WebBIOS

Figure 4-26

41) Allow the system to boot all the way into Windows.

42) Right-click on the **My Computer** icon on your desktop, and then select (left-click) the **Manage** item from the ensuing pop-up menu.

43) Click the '+' symbol next to the **Storage** item (if this item is in its collapsed state) in the left-hand navigation pane, and then select the **Disk Management** item. As we have a newly initialized array, the **Initialize and Convert Disk Wizard** should automatically appear. If you draw this dialog out of the way for a moment, you should see two disk drives similar to those shown in Figure 4-27.

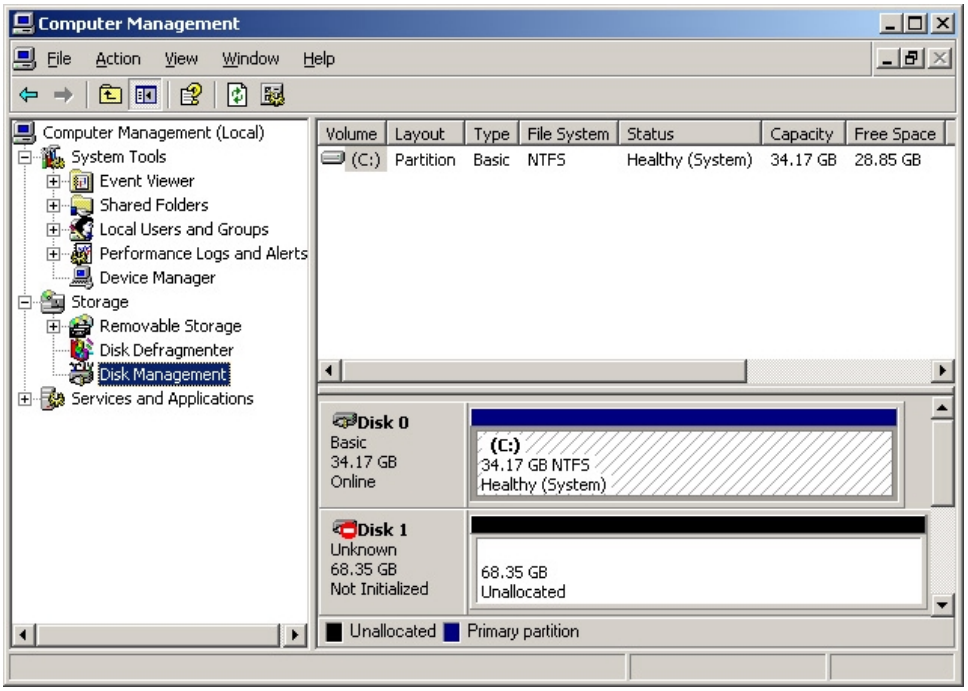

Figure 4-27

Note: In this example, **Disk 0** (drive **C:**) is the main system disk, while **Disk 1** (with no drive letter yet assigned) is the TeraPac RAID array, which – as far as the operating system in concerned – is **Unknown**, **Not Initialized**, and **Unallocated**.

44) We now return to the **Initialize and Convert Disk Wizard** as shown in Figure 4-28.

Initialize and Convert Disk Wizard
Welcome to the Initialize and Convert Disk Wizard
This wizard helps you to initialize new disks and to convert empty basic disks to dynamic disks.
You can use dynamic disks to create software-based RAID volumes that can be mirrored, or they can be striped or spanned across multiple disks. You can also expand single-disk and spanned volumes without having to restart the computer.
After you convert a disk to dynamic, you can only use Windows 2000 and later versions of Windows on any volume of that disk.
To continue, click Next.
< Back
Next >
Cancel

Figure 4-28

45) Click the **Next** button, which will result in a dialog prompting you to select the disk to be initialized (Figure 29). Ensure that the drive number associated with the TeraPac is selected (this is drive 1 in our example configuration as we discovered in Figure 27).

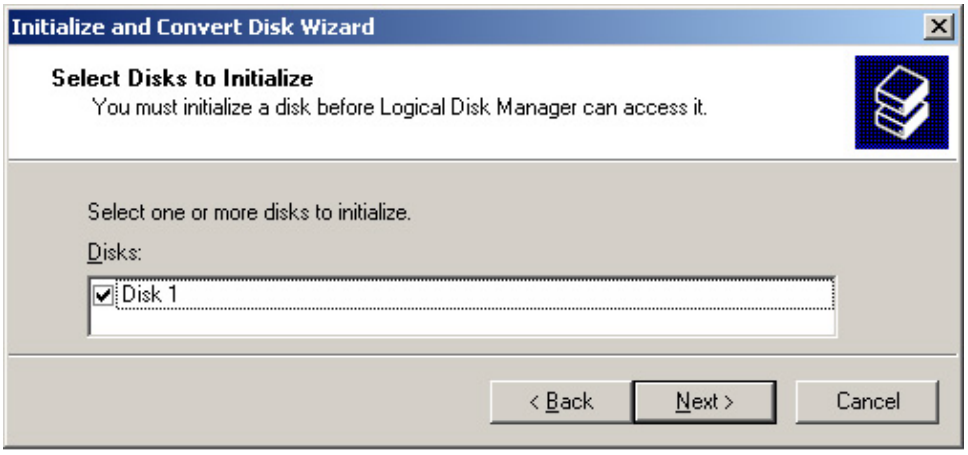
Initialize and Convert Disk Wizard
Select Disks to Initialize
You must initialize a disk before Logical Disk Manager can access it.
Select one or more disks to initialize.
Disks:
Disk 1
< Back
Next >
Cancel

Figure 4-29

46) Click the **Next** button, which will result in a dialog prompting you to select the disk you wish to convert (Figure 30). Ensure that the drive number associated with the TeraPac is selected (once again, this is drive 1 in our example configuration as we discovered in Figure 27).

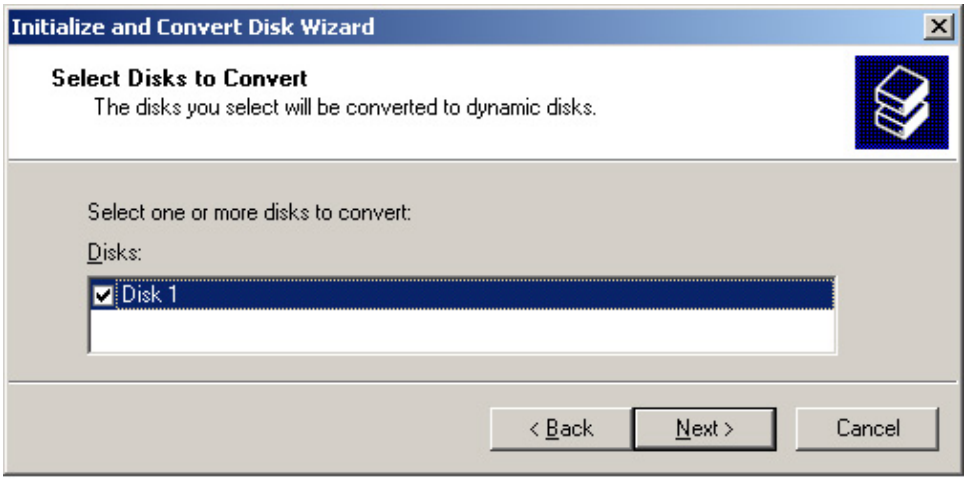
Initialize and Convert Disk Wizard
Select Disks to Convert
The disks you select will be converted to dynamic disks.
Select one or more disks to convert:
Disks:
Disk 1
< Back
Next >
Cancel

Figure 4-30

47) Click the **Next** button, which will result in the Completing dialog (Figure 4-31).

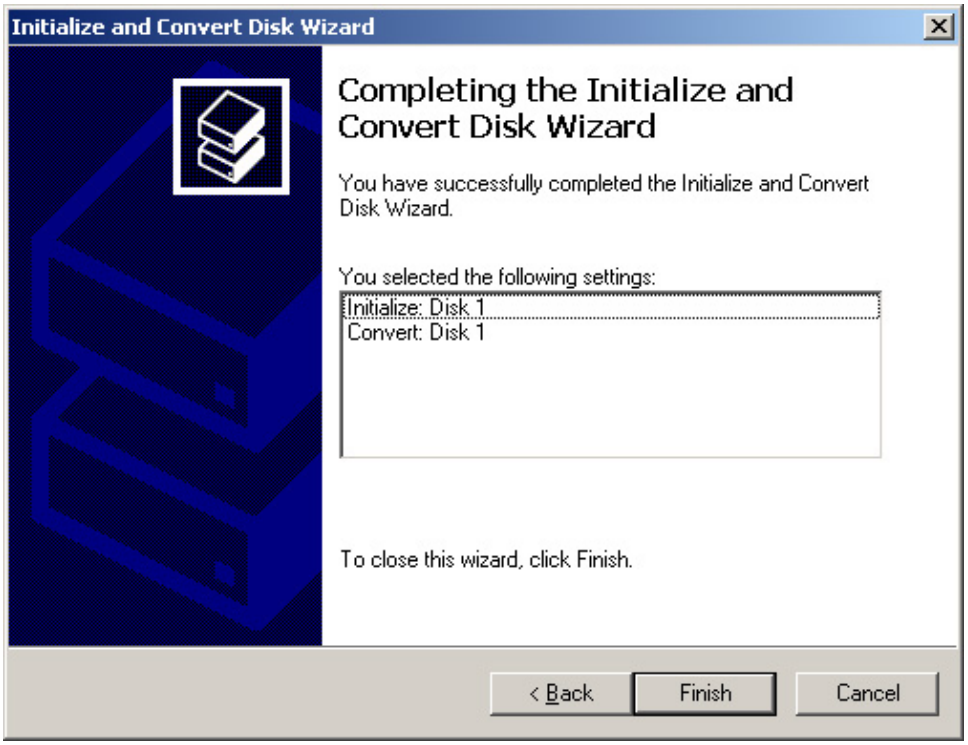
Initialize and Convert Disk Wizard
Completing the Initialize and Convert Disk Wizard
You have successfully completed the Initialize and Convert Disk Wizard.
You selected the following settings:
Initialize: Disk 1
Convert: Disk 1
To close this wizard, click Finish.
< Back
Finish
Cancel

Figure 4-31

48) Click the **Finish** button to complete the process. If you now turn your attention back to the **Computer Management** window, you will see that Disk 1 (or the equivalent on your system) is now shown as being **Dynamic** and **Online**. However, it is as yet **Unallocated**, which means that it has no drive letter, it is not formatted, and it has no partitions (Figure 4-32).

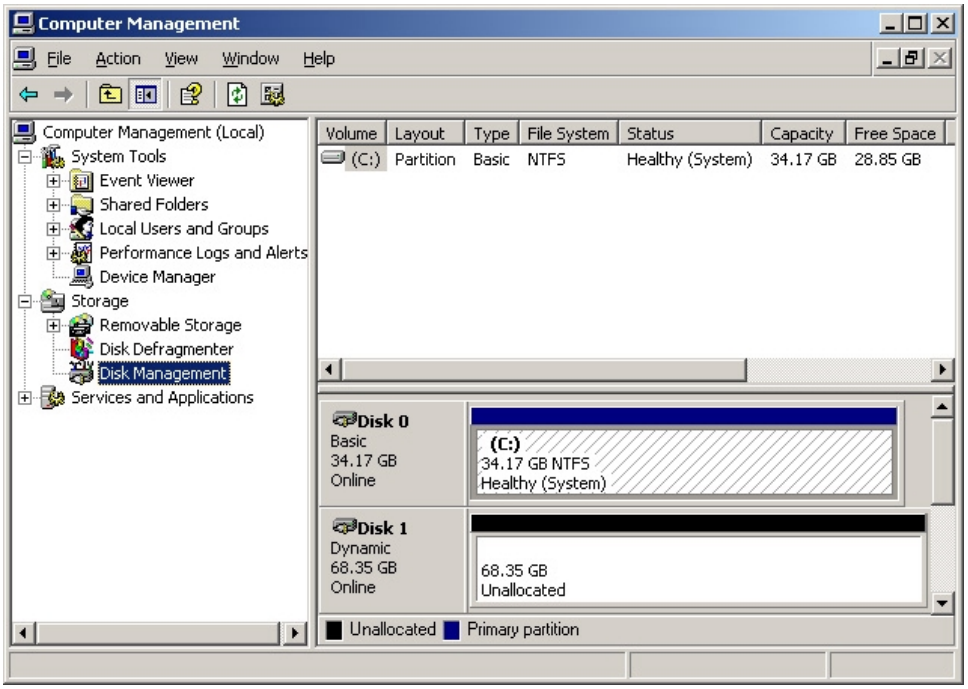

Figure 4-32

49) Observe that in Figure 4-32, the right-hand area associated with Disk 0 – the C: drive – is shown with diagonal lines. Click your mouse in the corresponding area associated with Disk 1, to see that become shaded/selected (Figure 4-33).

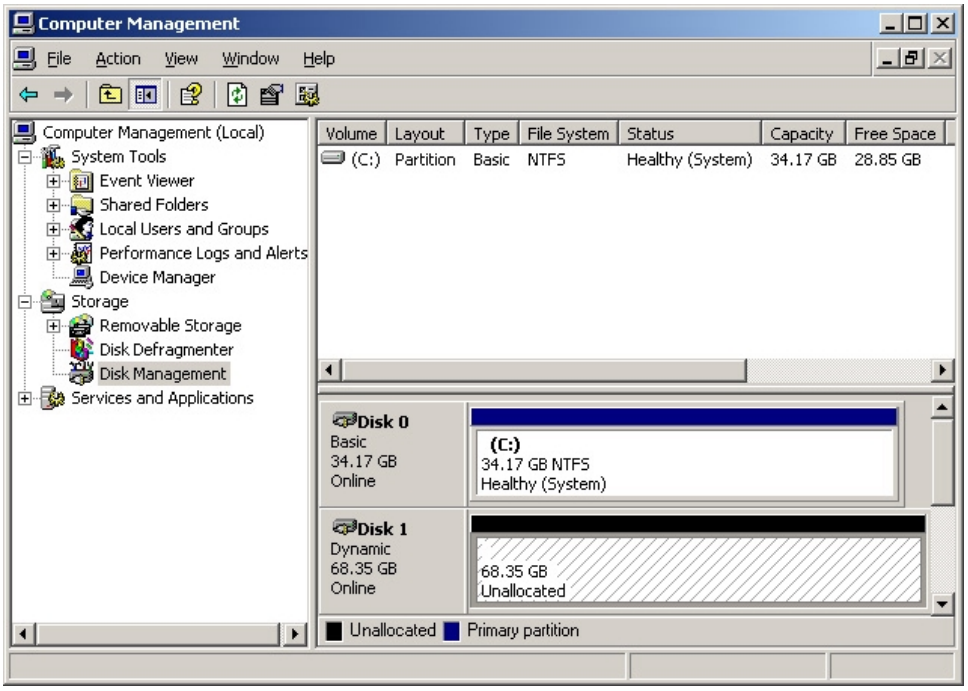

Figure 4-33

50) Now right-click in this shaded area and select (left-click) the **New Volume** item in the ensuing pop-up dialog. This will result in the **New Volume Wizard** appearing on your screen (Figure 4-34).

New Volume Wizard
Welcome to the New Volume Wizard
This wizard helps you create volumes on dynamic disks.
A volume is a portion of one or more hard disk drives that is treated as a separate disk. You can format a volume with a file system. You gain access to a volume through a drive letter or mount point.
To continue, click Next.
< Back
Next >
Cancel

Figure 4-34

51) Click the **Next** button, which will result in a dialog prompting you to select the type of volume you wish to create (Figure 4-35). Ensure that the **Simple** option is selected.

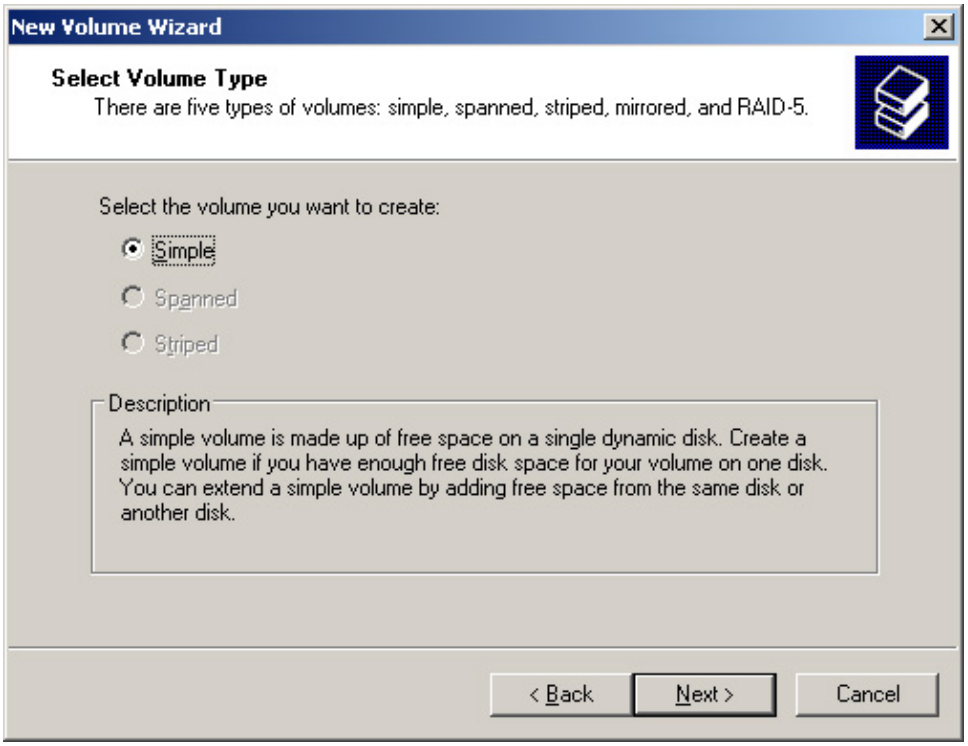
New Volume Wizard
Select Volume Type
There are five types of volumes: simple, spanned, striped, mirrored, and RAID-5.
Select the volume you want to create:
Simple
Spanned
Striped
Description
A simple volume is made up of free space on a single dynamic disk. Create a simple volume if you have enough free disk space for your volume on one disk. You can extend a simple volume by adding free space from the same disk or another disk.
< Back
Next >
Cancel

Figure 4-35

52) Click the **Next** button, which will result in a dialog prompting you to select the disks and set the disk size for this volume (Figure 4-36). Ensure that **Disk 1** is selected.

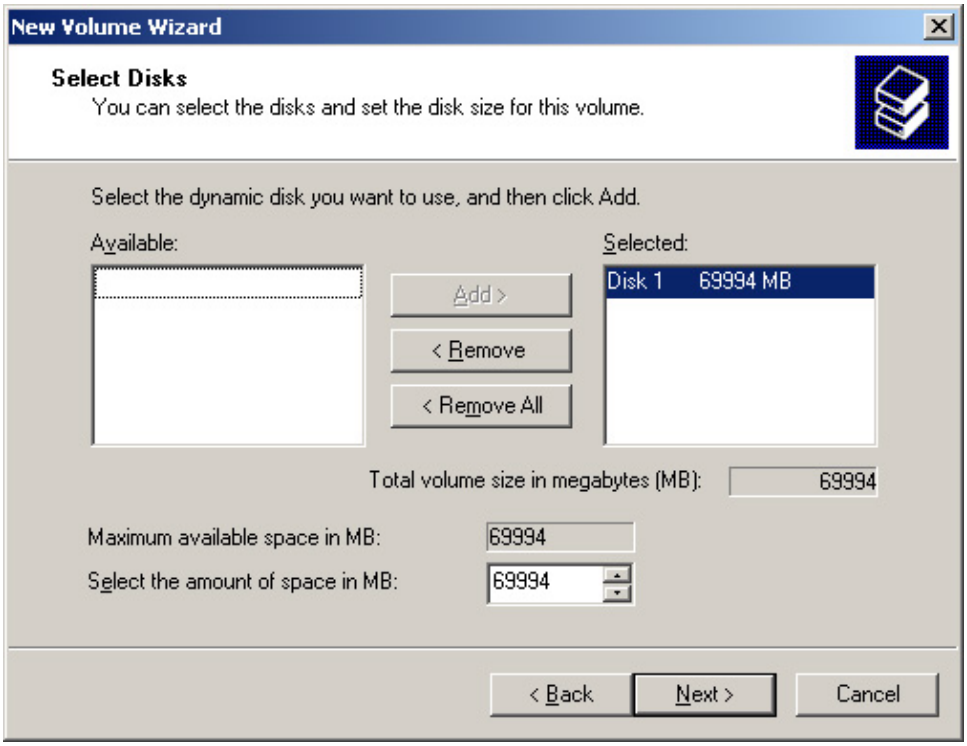
New Volume Wizard
Select Disks
You can select the disks and set the disk size for this volume.
Select the dynamic disk you want to use, and then click Add.
Available:
Selected:
Disk 1 69994 MB
Add >
< Remove
< Remove All
Total volume size in megabytes (MB): 69994
Maximum available space in MB: 69994
Select the amount of space in MB: 69994
< Back
Next >
Cancel

Figure 4-36

53) Click the **Next** button, which will result in a dialog prompting you to assign a drive letter (Figure 4-37). It is recommended that you accept whatever default the system recommends (E: in this case), but you may change this if you wish.

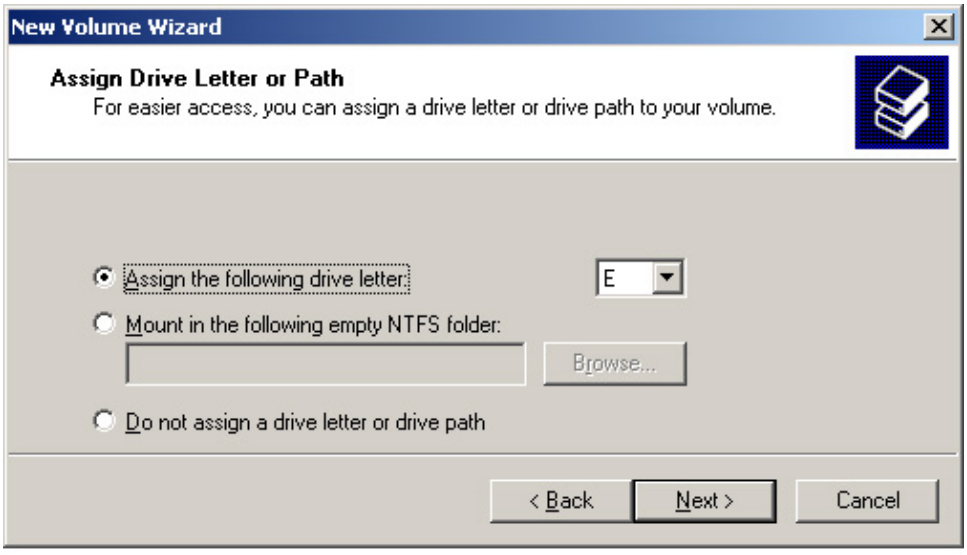
New Volume Wizard
Assign Drive Letter or Path
For easier access, you can assign a drive letter or drive path to your volume.
Assign the following drive letter:
E
Mount in the following empty NTFS folder:
Browse...
Do not assign a drive letter or drive path
< Back
Next >
Cancel

Figure 4-37

54) Click the **Next** button, which will result in a dialog prompting you format the disk (Figure 4-38). It is recommended that you set the **File System** to **NTFS**, set the **Allocation Unit Size** to **Default**,

and rename the **Volume Label** to **TeraPac** (or some other appropriate name). It is also recommended that you check the **Quick Format** box (unless you are operating under security requirements that oblige you to perform a full format).

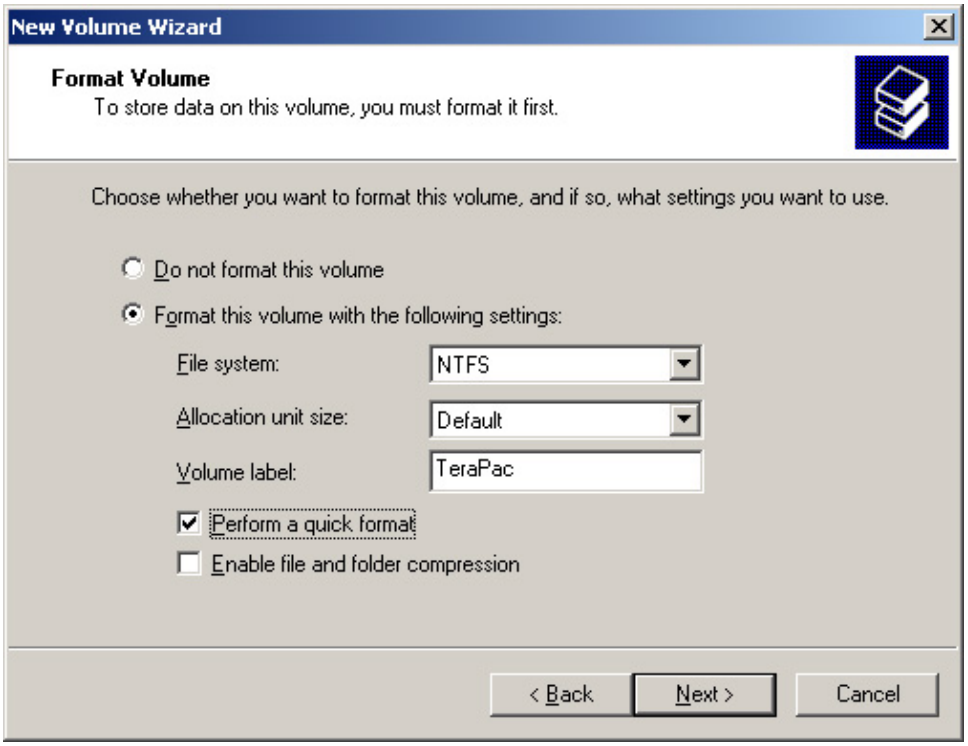
New Volume Wizard
Format Volume
To store data on this volume, you must format it first.
Choose whether you want to format this volume, and if so, what settings you want to use.
Do not format this volume
Format this volume with the following settings:
File system:
NTFS
Allocation unit size:
Default
Volume label:
TeraPac
Perform a quick format
Enable file and folder compression
< Back
Next >
Cancel

Figure 4-38

55) Click the **Next** button to receive the **Completing the New Volume** dialog (Figure 4-39).

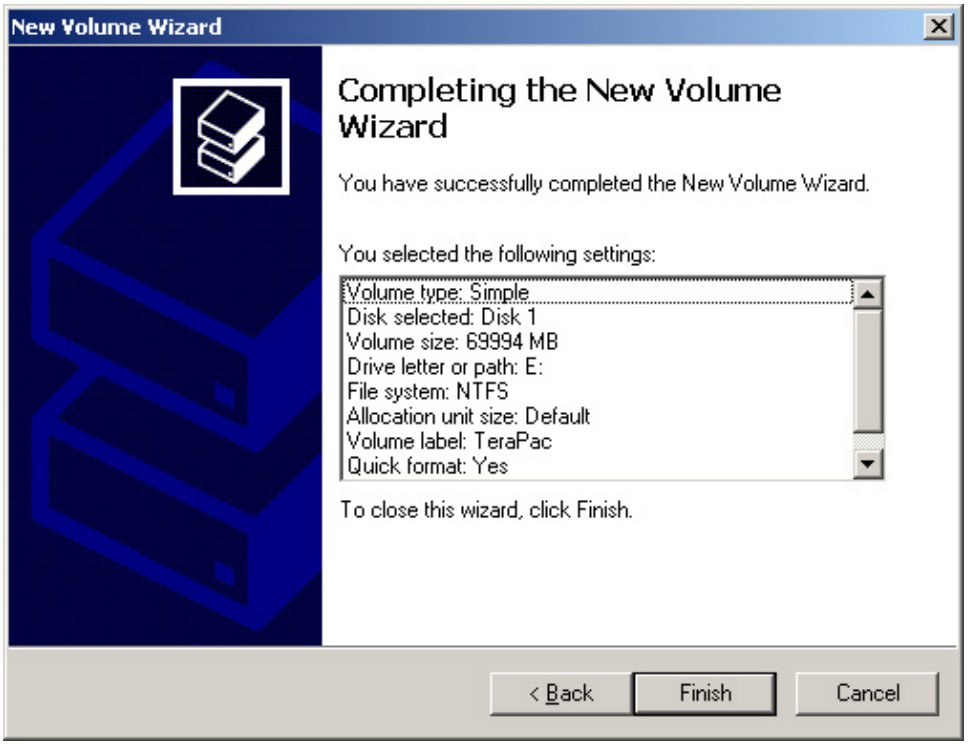

Figure 4-39

56) Click the **Finish** button to complete the formatting operation. In the **Computer Management** window you will now observe that Disk 1 has now been allocated the **E:** drive letter and its status changes to **Formatting** (Figure 4-40).

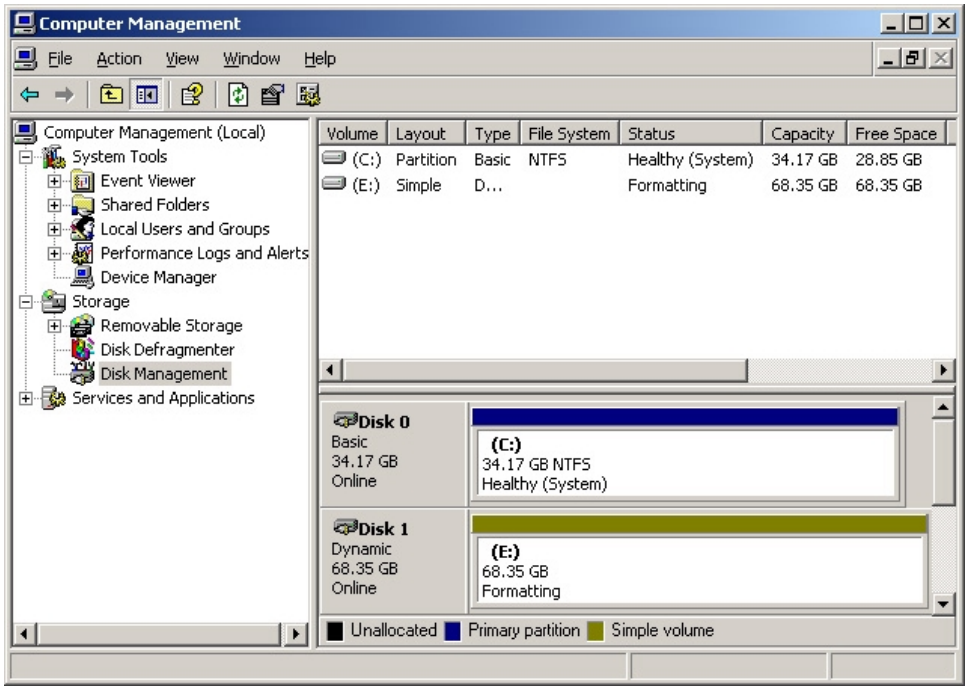

Figure 4-40

57) Wait until the status of drive E: changes to Healthy (Figure 4-41), at which point the process is complete.

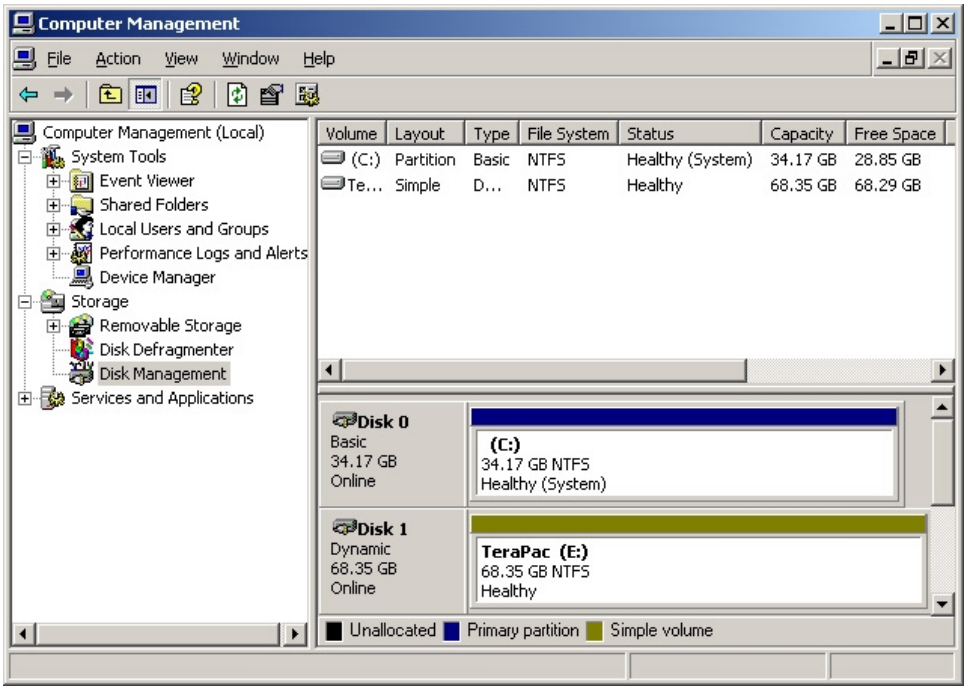

Figure 4-41

58) It is recommended that you copy a few large files and folders from the main system drive to the TeraPac array to ensure that everything is working as expected (don't forget to delete these files from the TeraPac when you have completed your tests).

Note: Whenever you wish to use your MaxPac in the future, ensure that your TeraPac has power and is connected to the MaxPac before powering-up the MaxPac.

Chapter 5: Recovering From Powering-Up a MaxPac Without Its TeraPac

The Recovery Process

Once you have mated a TeraPac to a MaxPac, you should always have them connected together when you power-up the MaxPac. If you do happen to forget to connect the TeraPac (or run into a similar circumstance such as failing to have the TeraPac supplied with power, for example), then the MegaRAID controller card will become “confused” when it fails to see the expected configuration.

In this Chapter we will walk through the process of recovering from this situation. For the purposes of these discussions, we will assume a system configuration identical to those discussed in Chapters 3 and 4. That is, the MaxPac contains a MegaRAID card with Channel 2 controlling the **C:** internal system drive and Channel 1 controlling a TeraPac containing three drives. In order to demonstrate the recovery process, we first have to cause the problem situation to occur.

1) Ensure that the system is powered down, disconnect the TeraPac’s data/control cable from the MaxPac, and then power up the MaxPac again. In the boot up sequence, you will see the MegaRAID controller report that SCSI IDs 8, 9, and 10 ob Channel 1 are failing to respond (Figure 5-1).

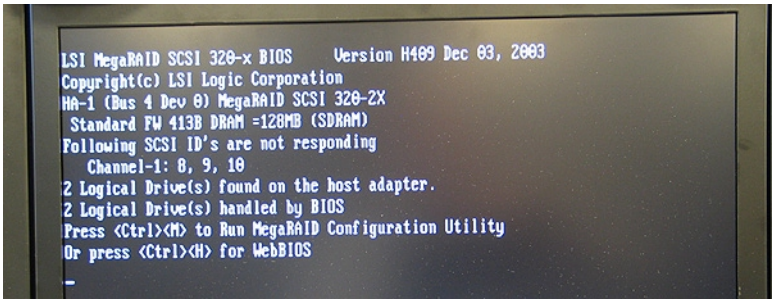
LSI MegaRAID SCSI 320-x BIOS Version H409 Dec 03, 2003
Copyright(c) LSI Logic Corporation
HA-1 (Bus 4 Dev 0) MegaRAID SCSI 320-2X
Standard FW 413B DRAM =128MB (SDRAM)
Following SCSI ID's are not responding
Channel-1: 8, 9, 10
2 Logical Drive(s) found on the host adapter.
2 Logical Drive(s) handled by BIOS
Press <Ctrl><M> to Run MegaRAID Configuration Utility
Or press <Ctrl><H> for WebBIOS

Figure 5-1

2) Unfortunately, the MegaRAID controller doesn’t cause the system to pause and warn you that a potential problem is about to occur. Instead, it allows the system to boot up all the way into Windows, by which time you really do have a problem. Once you are in Windows, right-click on the **My Computer** icon on your desktop, and then select (left-click) the **Manage** item from the ensuing pop-up menu.

3) Click the ‘+’ symbol next to the **Storage** item (if this item is in its collapsed state) in the left-hand navigation pane, and then select the **Disk Management** item. Not surprisingly, the system reports that it can only find the C: drive at the CD/DVD; the TeraPac simply isn’t there (Figure 5-2).

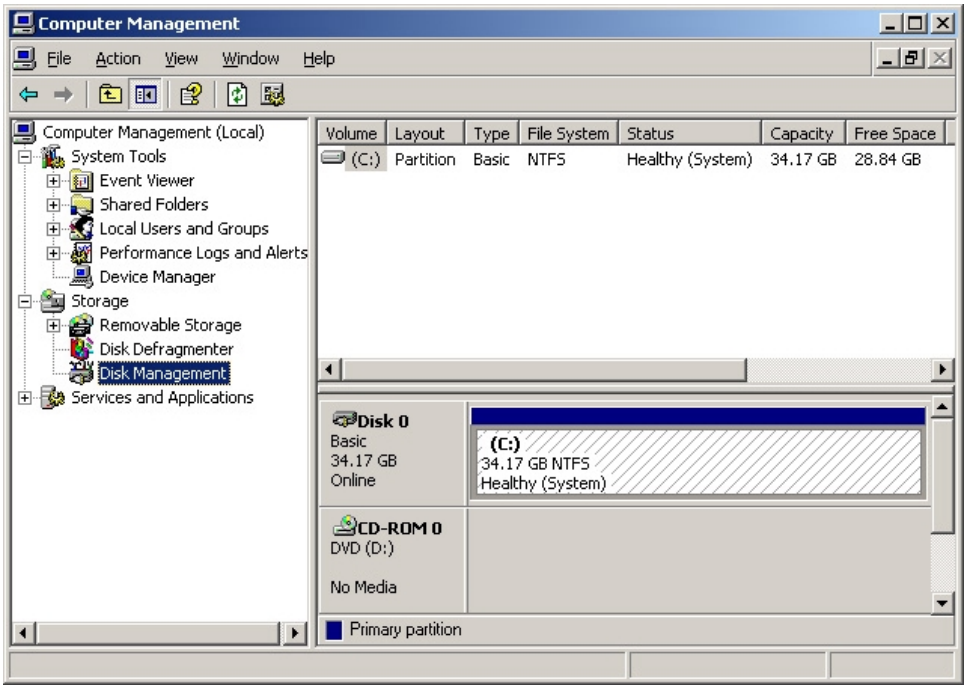

Figure 5-2

4) Power-down the MaxPac, reconnect the TeraPac, and restart the MaxPac power-up sequence (be prepared to press **<Ctrl>M** as discussed below). Early in the boot-up sequence, the MegaRAID controller will report that it's found two logical drives, but that one has failed (Figure 5-3).

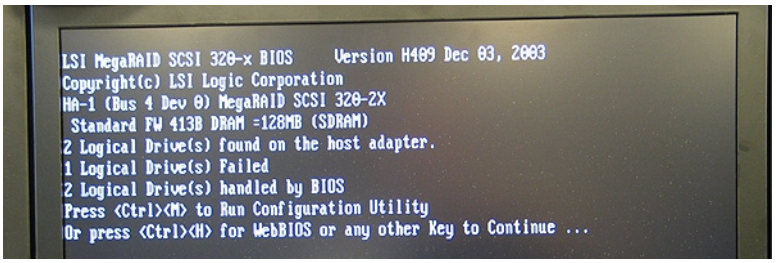
LSI MegaRAID SCSI 320-x BIOS Version H409 Dec 03, 2003
Copyright(c) LSI Logic Corporation
HA-1 (Bus 4 Dev 0) MegaRAID SCSI 320-2X
Standard FW 413B DRAM =128MB (SDRAM)
2 Logical Drive(s) found on the host adapter.
1 Logical Drive(s) Failed
2 Logical Drive(s) handled by BIOS
Press <Ctrl><M> to Run Configuration Utility
Or press <Ctrl><H> for WebBIOS or any other Key to Continue ...

Figure 5-3

5) Press the **<Ctrl>M** key combination when you are invited to do so, which will bring up the MegaRAID configuration utility interface.

6) Use the Up/Down arrow keys to highlight the **Objects** item in the **Management Menu** (Figure 5-4).

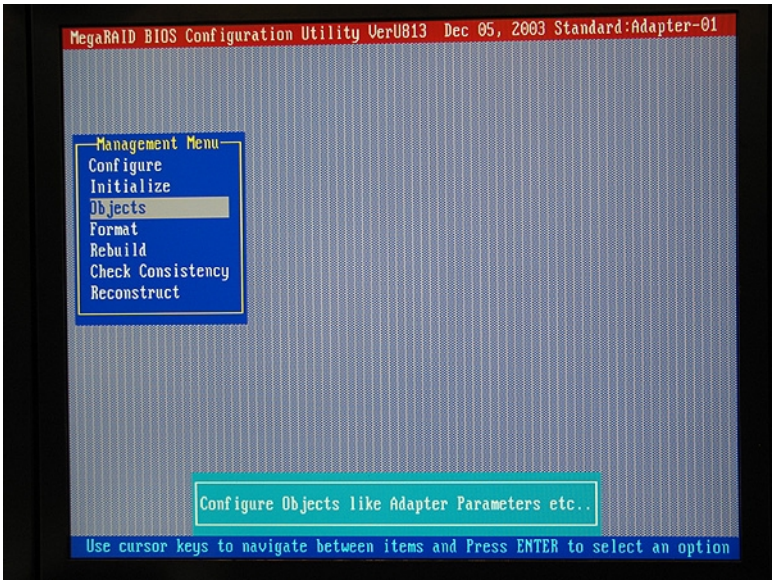

Figure 5-4

7) Press the **<Enter>** key to select this item, then use **the Up/Down** keys to highlight the **Physical Drive** item in the ensuing menu (Figure 5-5).

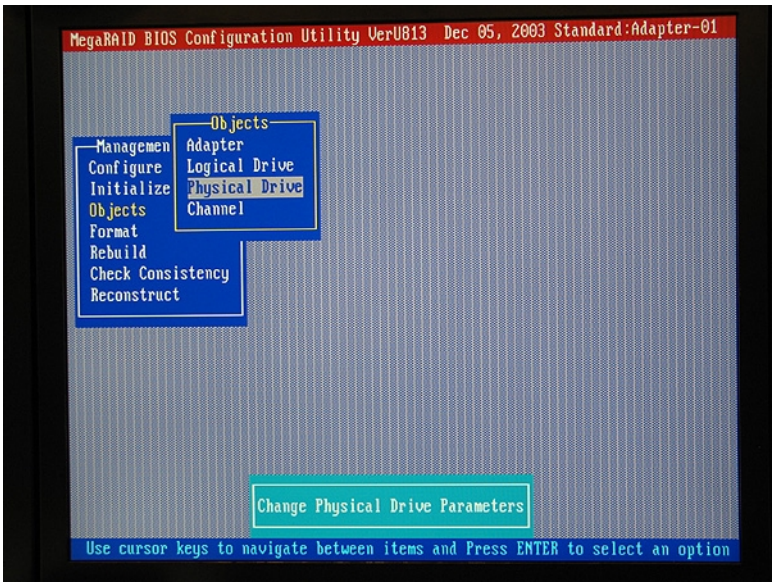

Figure 5-5

8) Press the **<Enter>** key to select this item. Observe the system scanning the drives, as reported in the status bar in the bottom of the window. Eventually, the system will return the Physical Drive Selection Menu (Figure 5-6).

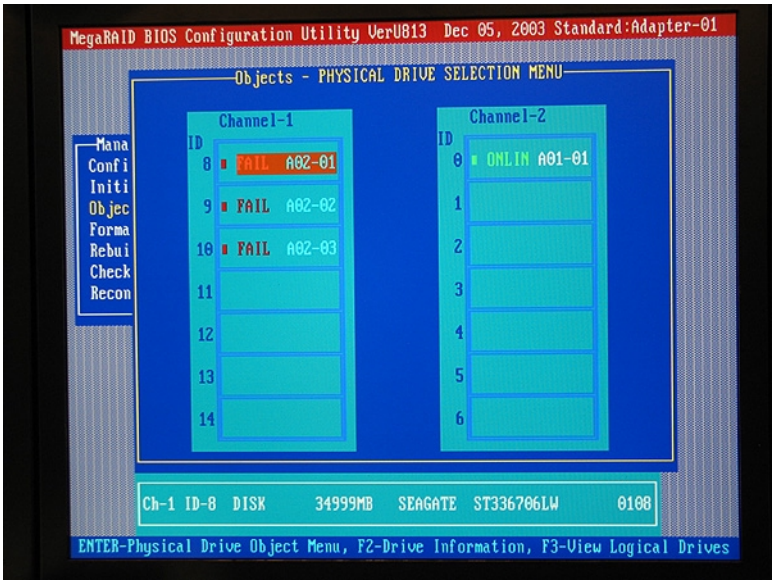

Figure 5-6

9) Observe the three **Failed** drives associated with Channel 1 on the left-hand side of the screen. These are the drives we have to reestablish without losing and of the data they contain.

10) Use the **Up/Down** arrow keys to highlight one of the failed drives (its' usual to start with Drive 8 and work our way up).

11) Press the **<Enter>** key to select the highlighted drive, then use the **Up/Down** arrow keys to highlight the Make Online item in the ensuing dialog (Figure 5-7).

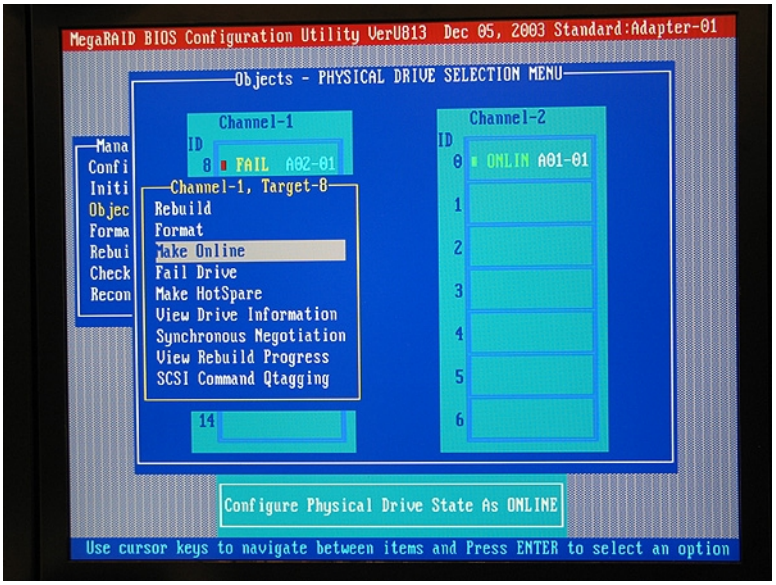

Figure 5-7

12) Press the **<Enter>** key to confirm this selection, and observe the pink warning screen that appears as shown in Figure 5-8).

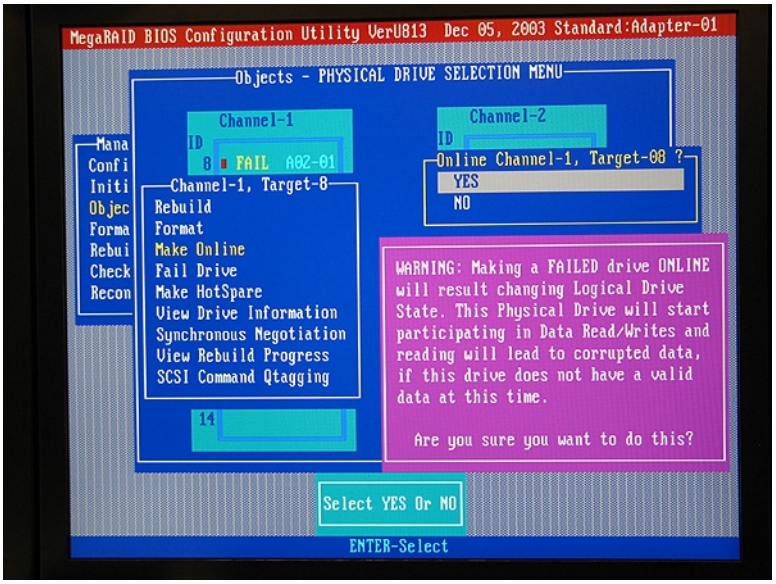
MegaRAID BIOS Configuration Utility VerU813 Dec 05, 2003 Standard:Adapter-01
Objects - PHYSICAL DRIVE SELECTION MENU
Channel-1
ID
8 FAIL A02-01
Channel-2
ID
Online Channel-1, Target-08 ?
YES
NO
Channel-1, Target-8
Rebuild
Format
Make Online
Fail Drive
Make HotSpare
View Drive Information
Synchronous Negotiation
View Rebuild Progress
SCSI Command Qtagging
WARNING: Making a FAILED drive ONLINE will result changing Logical Drive State. This Physical Drive will start participating in Data Read/Writes and reading will lead to corrupted data, if this drive does not have a valid data at this time.
Are you sure you want to do this?
Select YES Or NO
ENTER-Select

Figure 5-8

13) Use the **Up/Down** arrow keys to select the Yes option as shown above, then press the **<Enter>** key to confirm this selection. This drive is now reported as being **Online** (Figure 5-9).

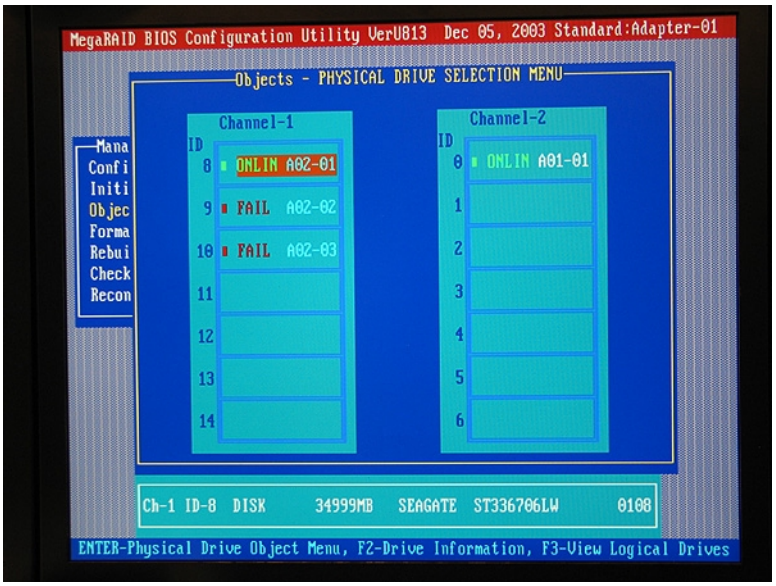

Figure 5-9

14) Repeat steps (10) through (13) fir the remaining failed drives until all three drives are reported as being back online (Figure 5-10).

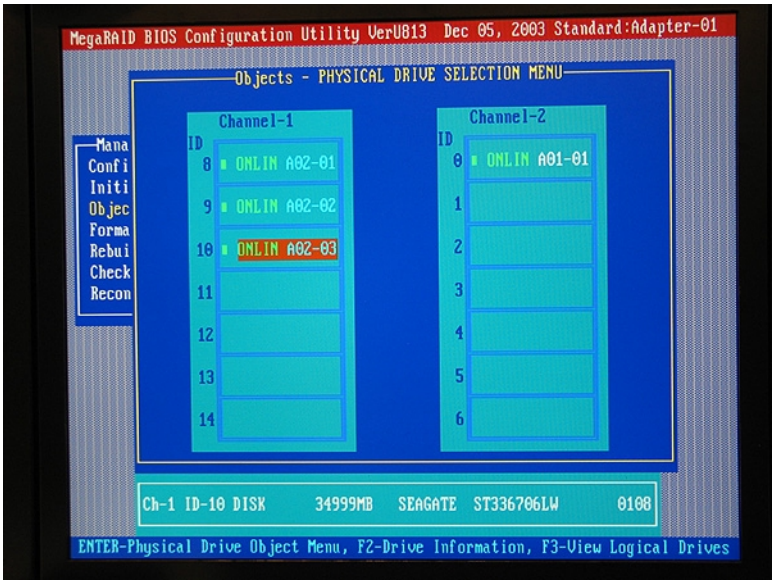

Figure 5-10

15) Press the **<Esc>** key repeatedly until you are presented with the **Exit** dialog, and then use the **Up/Down** arrow keys to select the **Yes** option (Figure 5-11).

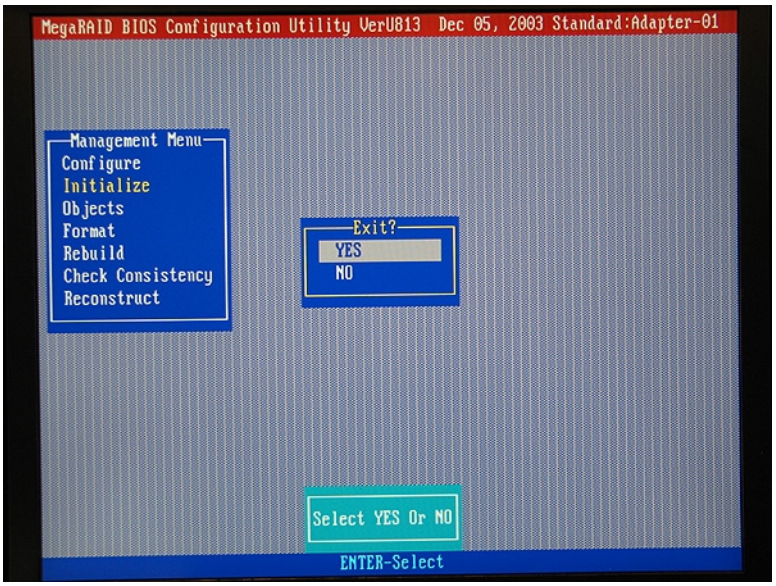

Figure 5-11

16) Press the **<Enter>** key to confirm this selection.

17) When you are presented with a message that the configuration has changed and you need to press the **<Ctrl><Alt><Delete>** keys to reboot …. press the **Ctrl><Alt><Delete>** keys to reboot.

18) Once the system has powered-up into Windows, right-click on the **My Computer** icon on your desktop, and then select (left-click) the **Manage** item from the ensuing pop-up menu.

19) Click the '+' symbol next to the **Storage** item (if this item is in its collapsed state) in the left-hand navigation pane, and then select the **Disk Management** item. This time, the system does find the TeraPac drive as expected (Figure 5-12).

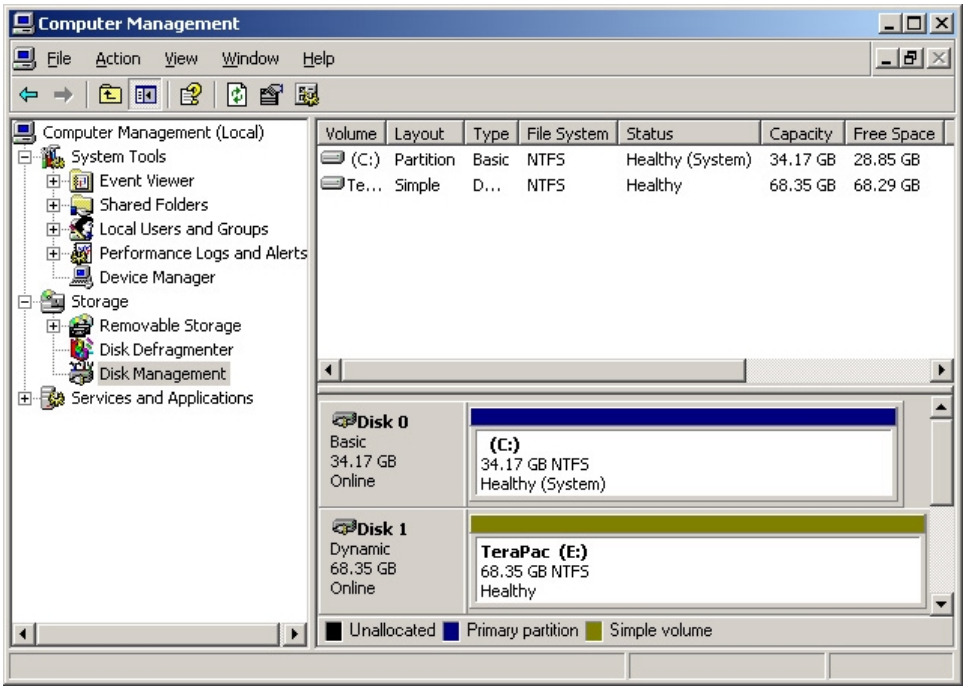

Figure 5-12

Chapter 6: Detecting, Isolating, and Replacing a Failed TeraPac Disk

The Detection, Isolation, and Replacement Process

In this Chapter we will walk through the process of recovering from a drive failing in the TeraPac's RAID array. For the purposes of these discussions, we will assume a system configuration identical to those discussed in Chapters 3 and 4. That is, the MaxPac contains a MegaRAID card with Channel 2 controlling the **C:** internal system drive and Channel 1 controlling a TeraPac containing three drives.

1) Let's assume that the third disk in the TeraPac (drive 10) has failed. Power-up the system and observe the MegaRAID report the failed drive (Figure 6-1)

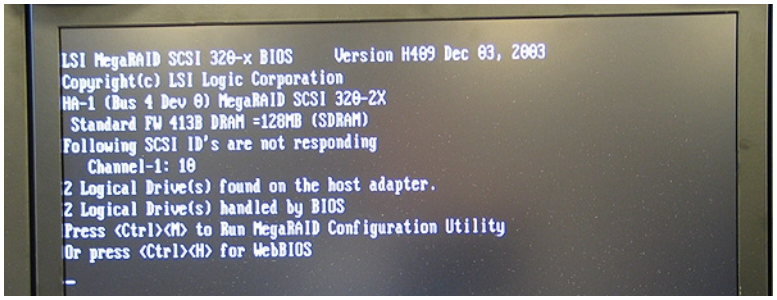
LSI MegaRAID SCSI 320-x BIOS Version H409 Dec 03, 2003
Copyright(c) LSI Logic Corporation
HA-1 (Bus 4 Dev 0) MegaRAID SCSI 320-2X
Standard FW 413B DRAM =128MB (SDRAM)
Following SCSI ID's are not responding
Channel-1: 10
2 Logical Drive(s) found on the host adapter.
2 Logical Drive(s) handled by BIOS
Press <Ctrl><M> to Run MegaRAID Configuration Utility
Or press <Ctrl><H> for WebBIOS

Figure 6-1

2) At this point, unless you've previously disabled it, a very annoying warning beeper will be trying to alert you to the fact that there is a problem. However, even though a drive has failed, you can continue to use the data on the remaining drives in the array (although it is strongly recommended that you replace the failed drive as soon as possible).

   If you do wish to keep on using the TeraPac with a failed disk, you will very quickly wish to turn the alarm off, so press **<Ctrl><M>** when prompted to do so, which will take you into the MegaRAID utility. Once you are in this utility, use the **Up/Down** arrow keys to highlight the **Objects** item in the **Management Menu** (Figure 6-2).

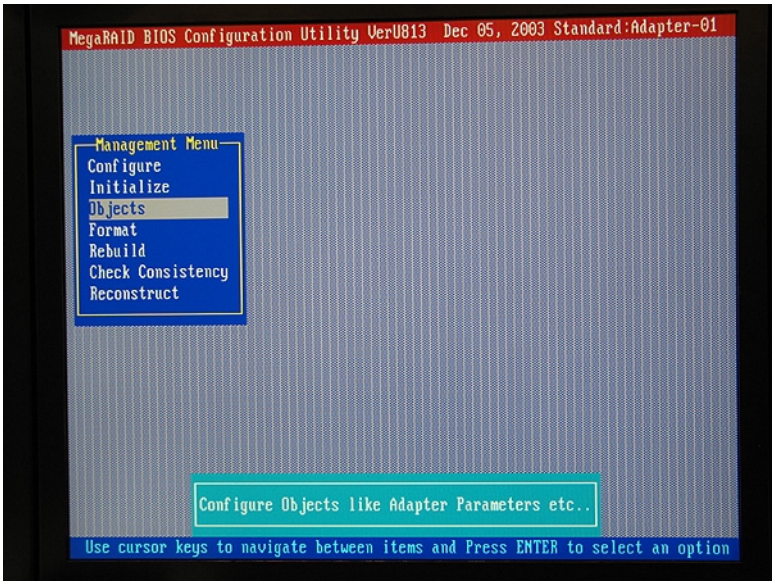

Figure 6-2

3) Press the **<Enter>** key to select this item and then use the **Up/Down** arrow keys to highlight the **Adapter** item in the ensuing menu (Figure 6-3).

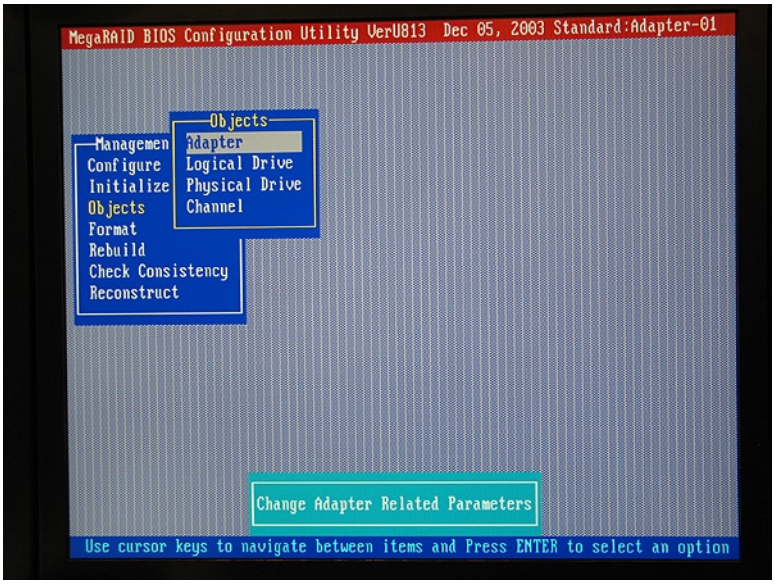

Figure 6-3

4) Press the **<Enter>** key to select this item and then use the **Up/Down** arrow keys to highlight the **Alarm Control** item in the ensuing menu (Figure 6-4).

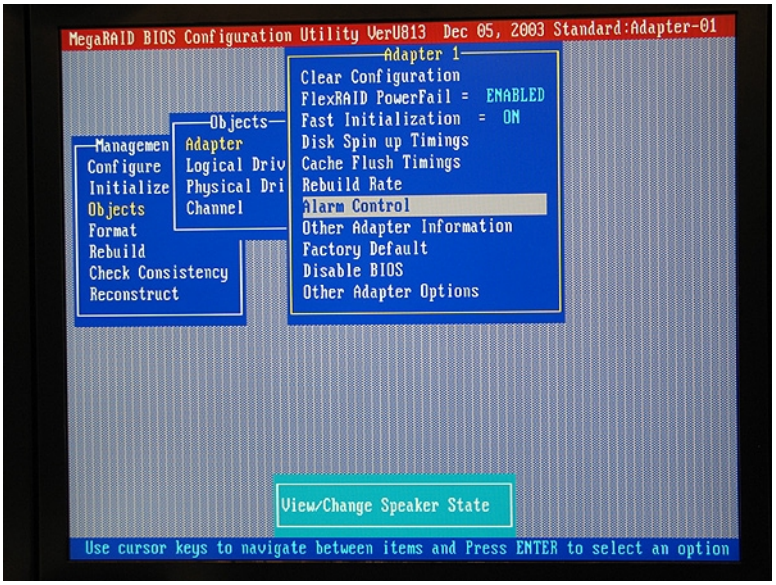

Figure 6-4

5) Press the **<Enter>** key to select this item and then use the **Up/Down** arrow keys to highlight the **Disable Alarm** item in the ensuing menu (Figure 6-5).

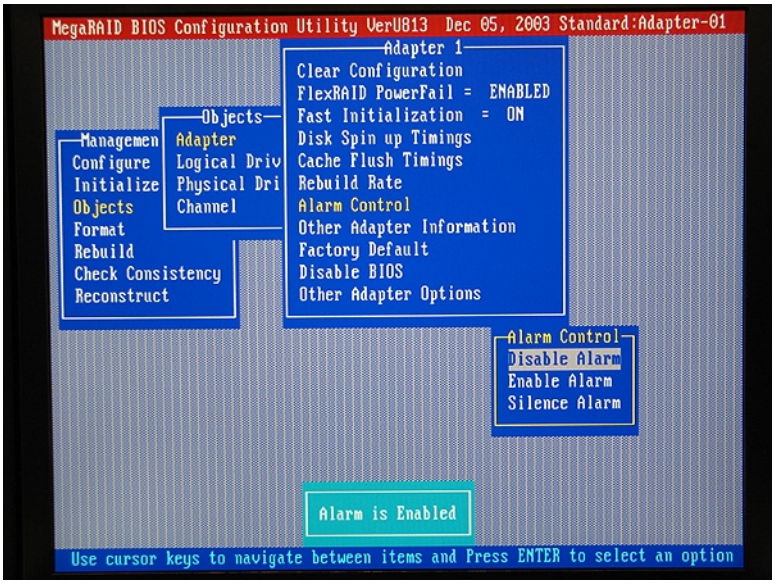

Figure 6-5

6) Press the **<Enter>** key to select this item and then use the **Up/Down** arrow keys to highlight the **Yes** item in the ensuing menu (Figure 6-6).

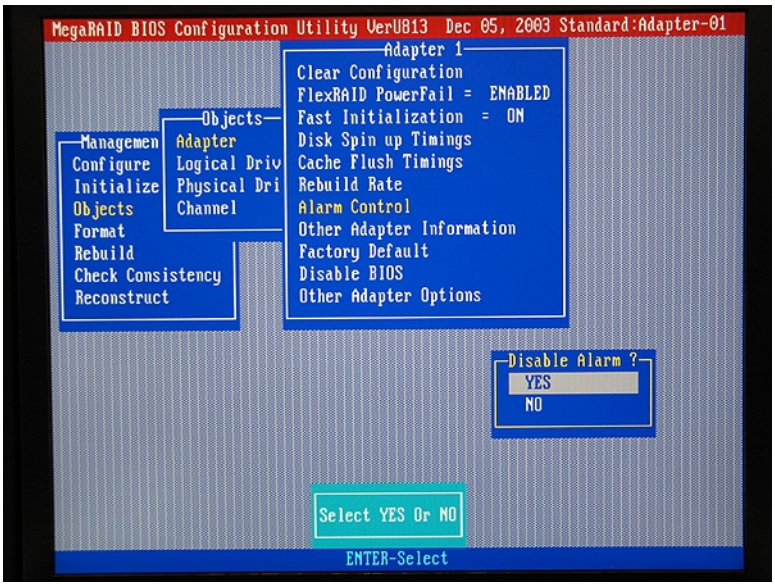

Figure 6-6

7) Press the **<Enter>** key to confirm this selection.

8) Press the **<Esc>** key repeatedly until you regress to the main **Management Menu**, then use the **Up/Down** arrow keys to highlight the **Configure** item (Figure 6-7).

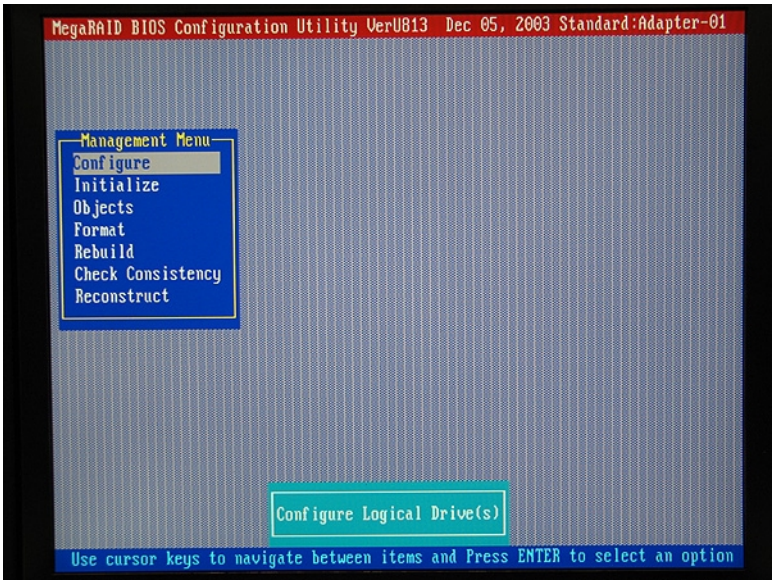

Figure 6-7

9) Press the **<Enter>** key to select this item then use the **Up/Down** arrow keys to highlight the **View/Add Configuration** item in the ensuing menu (Figure 6-8).

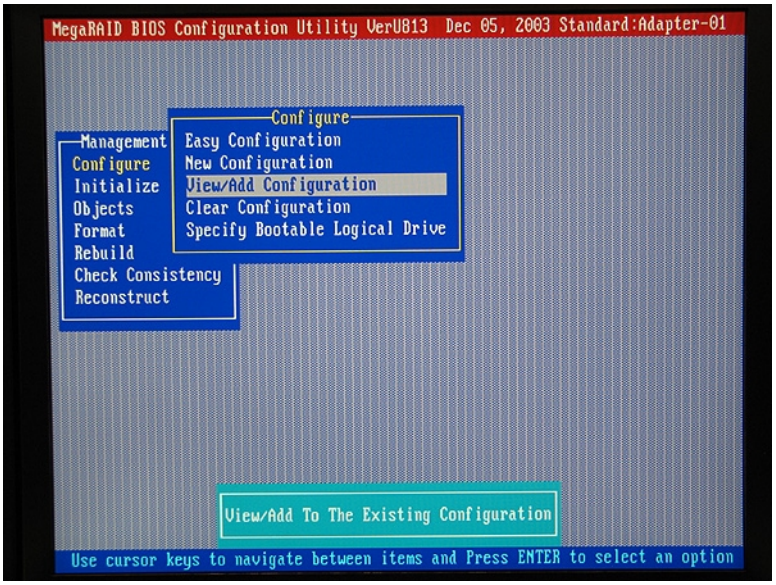

Figure 6-8

10) Press the **<Enter>** key to select this item and observe the system scanning the disks and reporting its progress in the status bar at the bottom of the window. The system eventually presents a summary of the scanned disks showing that it is indeed drive 10 that has **Failed** in some way (Figure 6-9).

Figure 6-9

11) Press the **<Esc>** key repeatedly until you are presented with the **Exit** dialog, and then use the **Up/Down** arrow keys to select the **Yes** option (Figure 6-10).

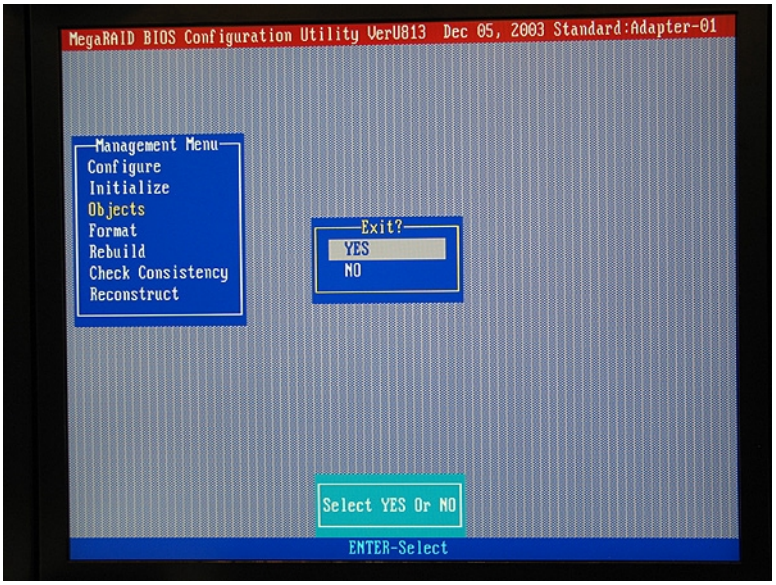

Figure 6-10

12) Press **<Enter>** to confirm this selection and then, when prompted to do so, press **<Control><Alt><Delete>** to reboot the system.

13) Once the system has powered-up into Windows, right-click on the **My Computer** icon on your desktop, and then select (left-click) the **Manage** item from the ensuing pop-up menu.

14) Click the '+' symbol next to the **Storage** item (if this item is in its collapsed state) in the left-hand navigation pane, and then select the **Disk Management** item. Observe that the system continues to display the status of Disk 1 as being Healthy, which it is as far as Windows is concerned (Figure 6-11).

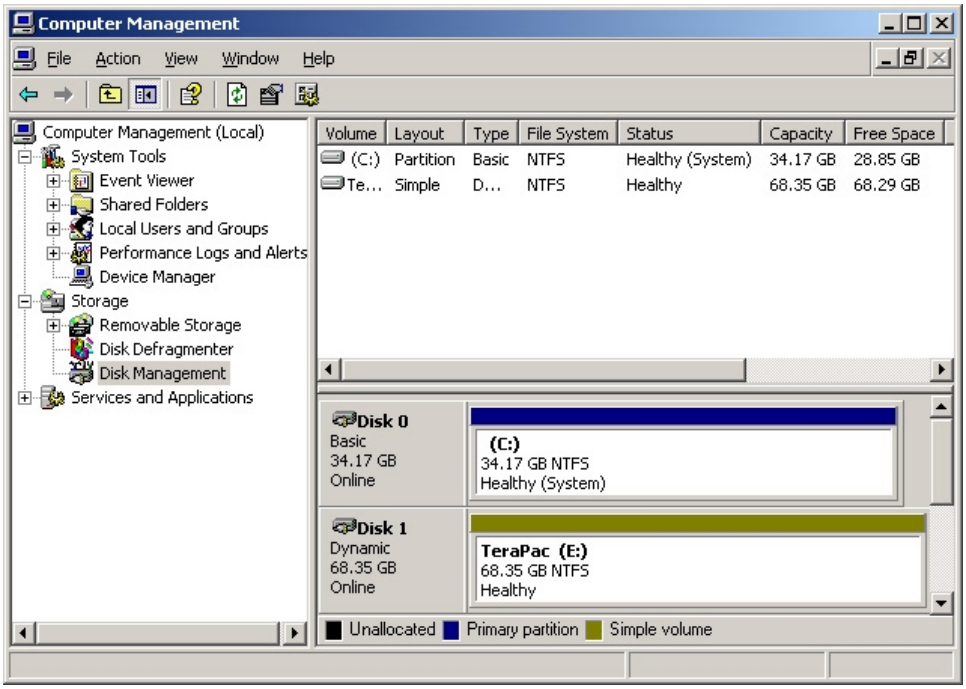

Figure 6-11

15) Remember that you can continue to use your TeraPac in the short term, but you should replace the failed drives as soon as possible. Once you are ready to replace the failed drive, power down your system, disconnect the TeraPac, lie it face down on the table, and remove the four screws holding the back cover (Figure 6-12).

16) Lift the cover away to reveal a brass-colored retaining and protection plate (Figure 6-13).

Figure 6-12

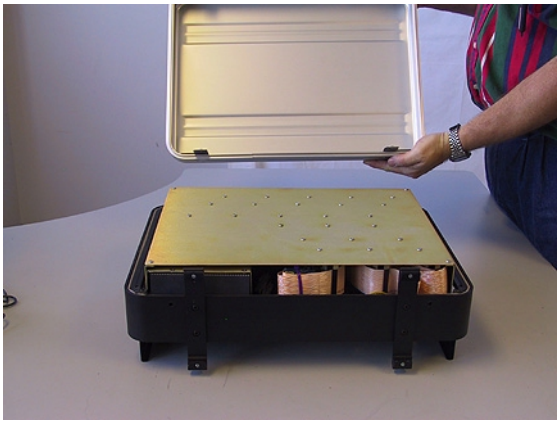

Figure 6-13

17) Remove all of the screws attaching the brass-colored retaining and protection plate to the hard disks and the rest of the chassis (Figure 6-14).

18) Stand the TeraPac up to provide full access to its internals (Figure 6-15).

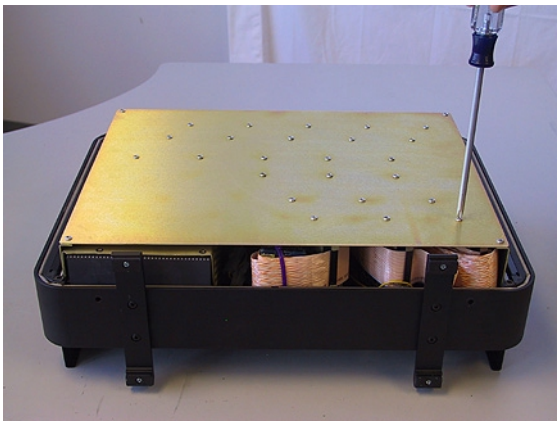

Figure 6-14

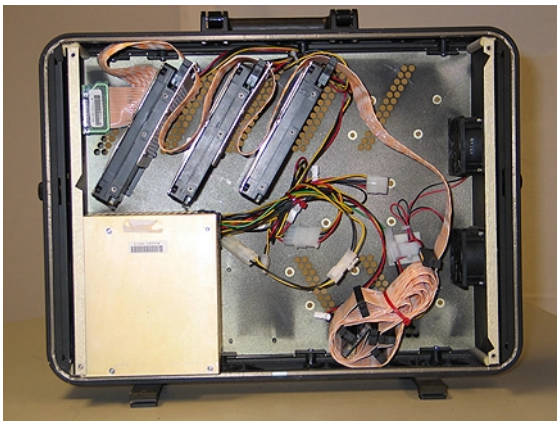

Figure 6-15

19) Observe that TeraPac discs should always follow a common numbering convention as shown in Figure 6-16.

20) From our earlier investigations, we know that disk 10 has failed, so turn the TeraPac around to expose the front size and remove the three screws attaching disk 10 to the chassis (Figure 6-17).

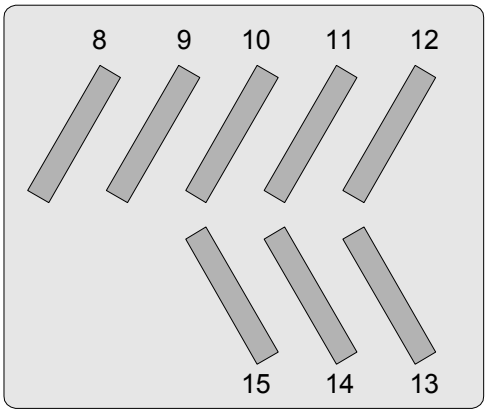

Figure 6-16

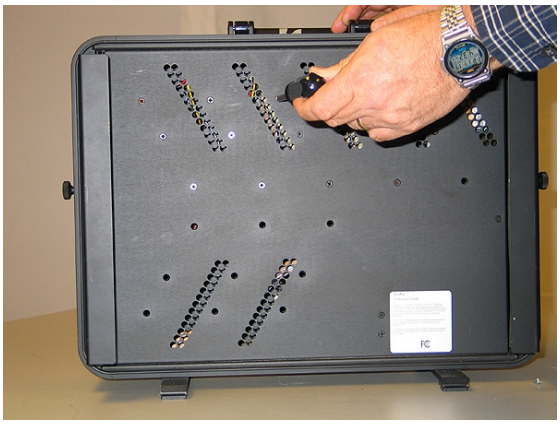

Figure 6-17

21) Gently extract the failed disk from the case, and then remove the four screws holding the cable retention plate to the back of the drive (Figure 6-18).

22) Carefully remove the cable retention plate and store it in a safe place (Figure 6-19).

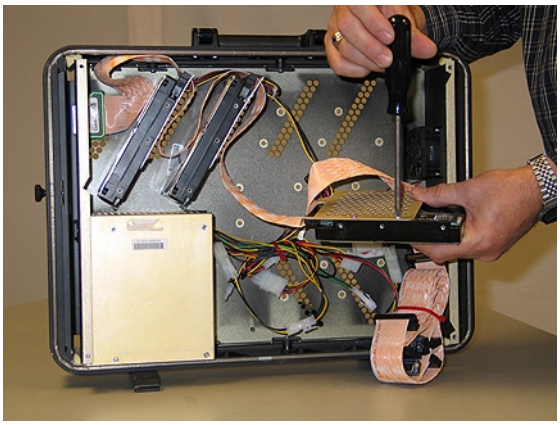

Figure 6-18

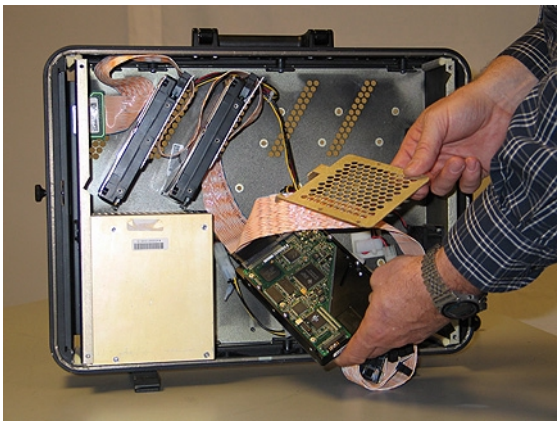

Figure 6-19

23) Disconnect the power and data cables from the failed disk and lay it on the desk (Figure 6-20).

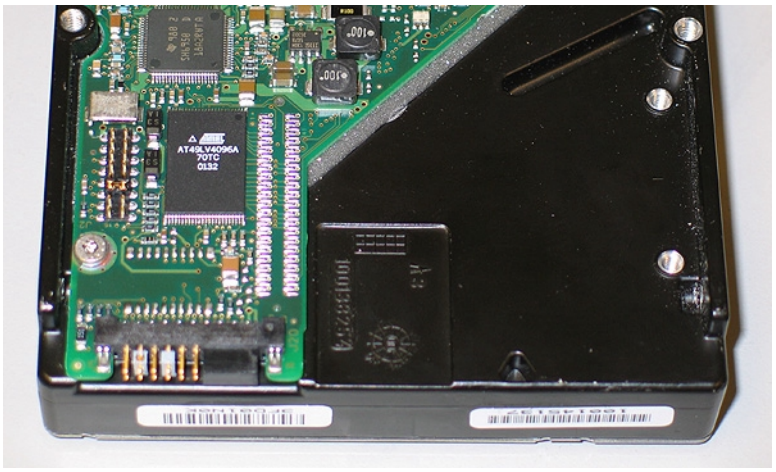

Figure 6-20

24) Observe the pins at the bottom left of this image. From left to right, the first four pairs of pins have binary weights of 1, 2, 4, and 8. Now observe the two gray jumpers connected to the pin pairs associated with binary weights 2 and 8; combined these equal 10, which is the number of the failed drive. The point is that the replacement drive must be keyed to match the number of the failed drive.

25) Once you have keyed the new drive to match the number of the failed drive, insert the drive into the TeraPac by performing the above steps in reverse order.

26) Reconnect the TeraPac's power and data/control cables, and then power-up the MaxPac. This time, the MegaRAID controller will report that it finds two logical drives, one of which is **Degraded** (Figure 6-21).

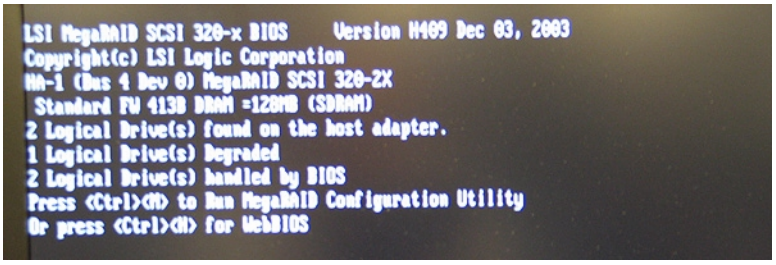
LSI MegaRAID SCSI 320-x BIOS Version H409 Dec 03, 2003
Copyright(c) LSI Logic Corporation
HA-1 (Bus 4 Dev 0) MegaRAID SCSI 320-2X
Standard FW 413B DRAM =128MB (SDRAM)
2 Logical Drive(s) found on the host adapter.
1 Logical Drive(s) Degraded
2 Logical Drive(s) handled by BIOS
Press <Ctrl><M> to Run MegaRAID Configuration Utility
Or press <Ctrl><H> for WebBIOS

Figure 6-21

27) Press **<Ctrl>M** when presented with the opportunity to do so, thereby entering the MegaRAID configuration utility. Use the **Up/Down** keys to highlight the **Rebuild** item in the main menu (Figure 6-22).

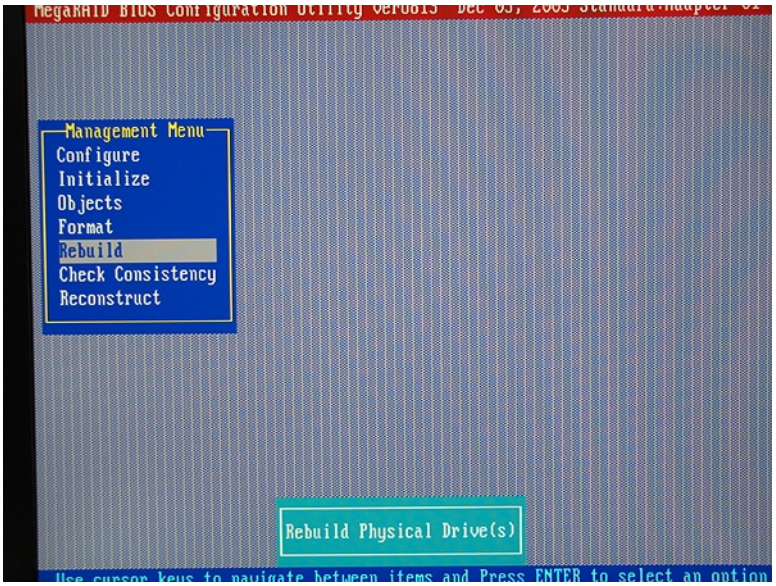

Figure 6-22

28) The **Rebuild** option will bring this drive into the RAID array and reload it with its share of the RAID 5-related data from the other drives in the array. Press the **<Enter>** key to confirm this selection and observe the system display the current configuration (Figure 6-23).

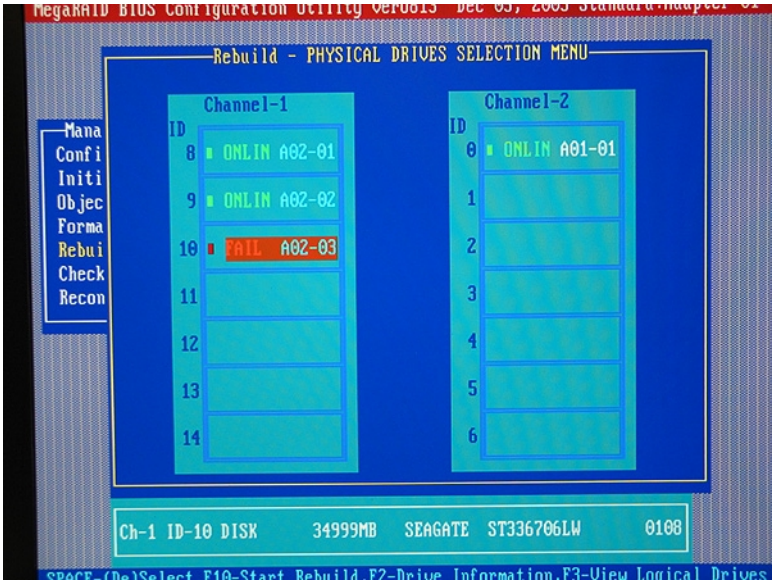

Figure 6-23

29) Use the **Up/Down** keys to highlight the failed drive and then press the **<Space>** key to select this drive (it will start flashing to indicate that it has indeed been selected).

30) Press the **<F10>** key to initiate the rebuild process and use the **Up/Down** keys to highlight the **Yes** option in the ensuing menu (Figure 6-24).

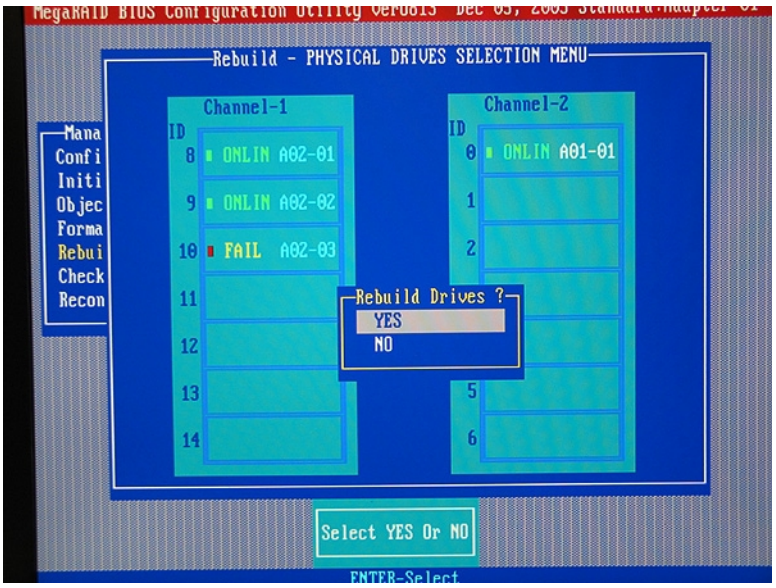

Figure 6-24

31) Press the **<Enter>** key to confirm this selection and observe the real-time display showing the progress of the replacement drive being integrated into the array (Figure 6-25).

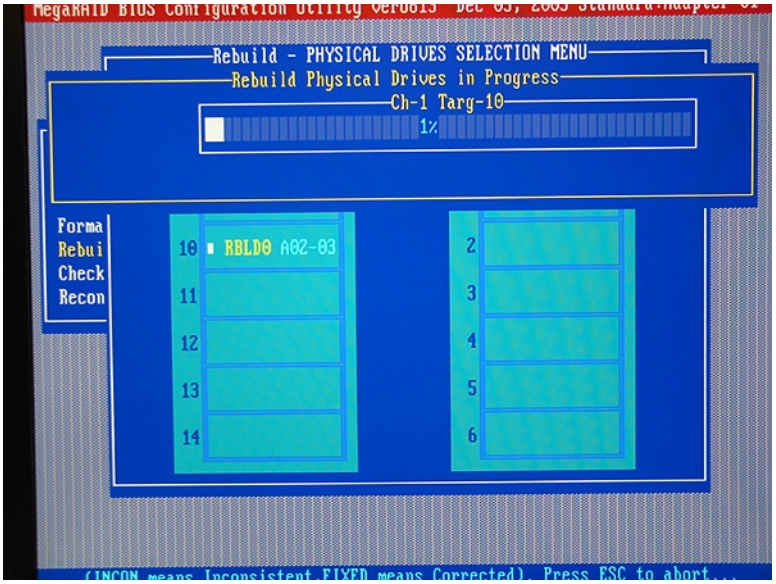

Figure 6-25

32) Press the **<Esc>** key repeatedly until you are presented with the **Exit** dialog, and then use the **Up/Down** arrow keys to select the **Yes** option (Figure 6-26).

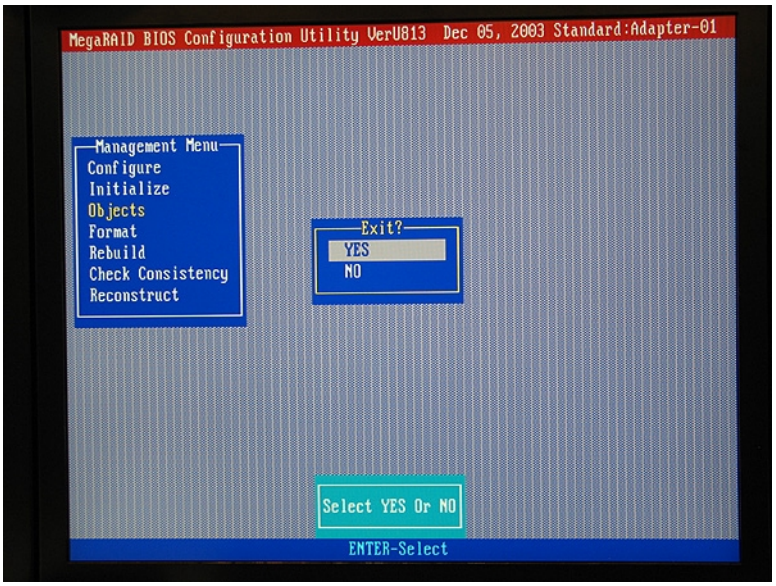

Figure 6-26

33) Press **<Enter>** to confirm this selection and then, when prompted to do so, press **<Control><Alt><Delete>** to reboot the system.

Appendix A: Contacting MaxVision Support (RMA and Serial Numbers)

Repairing/Replacing Products/Accessories

MaxVision will repair or replace products/accessories due to defects in material or workmanship, or any failure of the hardware system to conform to written specifications. Warranty repairs will be performed at MaxVision's service center. Any replacement parts/products shall be new or refurbished. Any repaired or replaced product will not extend the original warranty term of the product. Additionally, this warranty period will not be extended as a result of the purchase of any additional parts/products from MaxVision Corporation.

Contacting Technical Support and RMA Numbers

During the warranty period, MaxVision will provide technical support for hardware diagnosis via email (maxvision.support@maxvision.com) or the technical support and customer service hotline (800-533-5805). If MaxVision's technical support determines that the product is defective, MaxVision will issue a *Return Material Authorization (RMA)* number to the customer. The customer is required to ship the product referencing the RMA number on the outside of the original (or equivalent) packaging with a copy of MaxVision's invoice enclosed. The return shipment must be sent insured and prepaid to

MaxVision Corporation
495 Production Avenue
Madison, AL 35758
USA

MaxVision will ship the repaired or replaced product to the customer with freight prepaid if the customer's address is within United Stated of America (excluding Alaska, Hawaii, Puerto Rico and U.S. possessions). Shipments to other locations will be shipped at the customers expense. MaxVision must receive notice of all events before the warranty period expires. NOTE: MaxVision will not be responsible for data on the hard-disk drive. Before you ship the product(s) to MaxVision, please back up your data from the hard-disk drive(s)or any other storage device(s) in the product(s).

Next Business Day Delivery/On-site Service for Parts

For contracts with next business day parts delivery/on-site clauses, in order to ensure receipt of parts by the next business day, the problem must be resolved between the customer and MaxVision's technical support department before noon, Central time, if parts are available. For calls resolved after noon Central time, the receipt of parts by the customer may take one additional business day.